The Reliability of Retrospective Methods for Exploring Onset of Height Fear

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ABSTRACT

The non-associative framework on fear argues that evolutionary-relevant fears, such as heights and water, are largely innate and do not require associative conditioning experiences to develop (Menzies & Clarke, 1993a, b; Poulton & Menzies, 2002a). However, this framework has been criticized for its reliance on retrospective recall for empirical support (Mineka & Öhman, 2002), which has been found to be highly unreliable (Taylor, Deane, & Podd, 1999). Thirty height-fearful undergraduate students completed the Origins Questionnaire-II (OQ-II; Menzies & Parker, 2001) and were classified into one of the several associative and non-associative pathways of fear onset based on their responses. A control group of 43 non-fearful students completed a modified version of the OQ-II to report any past experiences with heights. To examine the stability of these responses over time, the same questionnaires for both groups were completed again three months (Time 2) and 12 months (Time 3) after the initial administration of the test, along with measures of fear severity. Results showed that neither associative nor non-associative accounts took precedence over the other in explaining the onset of height fear. Instabilities in pathway ascriptions were observed in 18.18% of cases over three months (between Time 1 and Time 2), and 27.27% of cases over nine months (between Time 2 and Time 3). The theoretical and practical implications of the results are discussed with consideration of some of the study's procedural and instrumental limitations. In light of these limitations, this study identified a substantial role of non-associative pathways on the development of height fear, and provided further support for the limitations of retrospective recall for ascertaining the pathway to fear onset.

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TABLE OF CONTENTS

ABSTRACT ..... **II**
ACKNOWLEDGEMENTS ..... **III**
TABLE OF CONTENTS ..... **IV**
LIST OF TABLES ..... **VI**
INTRODUCTION **1**
Definitions and Related Aspects of Fear 1
Prevalence of Anxiety Disorders and Specific Phobias 3
Course & Co-Morbidity of Anxiety Disorders & Specific Phobias 3
The Etiology of Phobias 5
Associative pathways: Rachman's three-pathways theory 5
Non-Associative Pathways 12
Research on the Fear of Heights 14
Reliability of Retrospective Accounts 16
The Present Study 20
METHOD **22**
OVERVIEW 22
PHASE 1: SCREENING AND PARTICIPANT SELECTION 22
Participants 22
Measures 23
Fear Survey Schedule-Second Edition (FSS-II) 23
Outcome of the Screening Phase 25
PHASE 2: STUDY PHASE 26
Participants 26
Measures 30
Origins Questionnaire-Second Edition (OQ-II) – *Height fear group* 30
Origins Questionnaire-II Modified (OQ-II-M) – *Height non-fearful group* 35
Acrophobia Questionnaire (AQ) 35
Trait Scale of the State-Trait Anxiety Inventory (STAI-T Form Y-2) 36
Help-seeking Questionnaire – Height Fear Group 37
PROCEDURE & ETHICAL CONSIDERATIONS 38
RESULTS **40**
OVERVIEW 40
Screening and Missing Data 40
Data Analysis 41
Selection of Statistics 42
DESCRIPTIVE STATISTICS 44
HYPOTHESIS 1: ASSOCIATIVE VERSUS NON-ASSOCIATIVE PATHWAYS 45
Classification of Pathways 45

Fearful Participants' Ascription of Onset Pathways 50
HYPOTHESIS 2: STABILITY OF RETROSPECTIVE RECALL 55
Stability of Pathway Ascription 56
Stability of Height Fear Severity and Trait Anxiety 59
HYPOTHESIS 3: HEIGHT-RELATED INTERVENING EVENTS 61
SUMMARY OF RESULTS 64

DISCUSSION 65
HYPOTHESIS 1: ASSOCIATIVE VERSUS NON-ASSOCIATIVE PATHWAYS 66
Implications for Associative Theories 66
Implications for Non-Associative Theories 68
HYPOTHESIS 2: STABILITY OF RETROSPECTIVE RECALL 72
HYPOTHESIS 3: EFFECTS OF INTERVENING EVENTS 75
SUMMARY OF LIMITATIONS AND FUTURE RECOMMENDATIONS 77
CONCLUSION 81

REFERENCES 83
APPENDIX A: Phase 1 Survey Pack 88
APPENDIX B: Phase 1 Results Posting 93
APPENDIX C: Phase 2 Results Posting 96
APPENDIX D: Phase 2 Survey Pack 101
APPENDIX E: Fear Group Questionnaire 106
APPENDIX F: Non-Fear Group Questionnaire 118
APPENDIX G: Comparisons Between Participants Who Did and Did Not Complete All Three Questionnaires 127
APPENDIX H: OQ-II Scoring Criteria 128
APPENDIX I: STAI-T Y-2 Permission For Use 129
APPENDIX J: Massey University Human Ethics Committee (MUHEC) Approval 131
APPENDIX K: Research Confidentiality Agreement 133
APPENDIX L: Formulas and Interpretation for Coefficients of Effect Size 135
APPENDIX M: Raw Data On Participants' Pathway Ascriptions 136

LIST OF TABLES

Table 1 Study group composition and characteristic at Time 1 28

Table 2 Participant attrition across the three times of data collection 29

Table 3 Percentage of participants in the fear group (*N* = 30) who had spoken with different people regarding their height fear 44

Table 4 Degree to which participants in the fear group (*N* = 30) felt they needed or were likely to seek professional psychological help for their height fear 45

Table 5 Frequency of pathway classifications for the fear group at initial assessment (Time 1), three months later (Time 2), and 12 months later (Time 3) 50

Table 6 Fear severity and trait anxiety of participants who ascribed to associative and non-associative pathways 51

Table 7 Number of participants who had experienced associative events with heights 52

Table 8 Mean level of fear experienced during associative events 52

Table 9 Stability of pathway ascriptions over three months between Time 1 and Time 2 56

Table 10 Stability of pathway ascriptions over nine months between Time 2 and Time 3 58

Table 11 Mean (*SD*) fear severity and trait anxiety over a 12-month period 59

Table 12 Changes in total AQ and STAI-T scores for individual participants who reported change in fear severity between Time 1 and Time 2 63

Table 13 Changes in total AQ and STAI-T scores for individual participants who reported change in fear severity between Time 2 and Time 3 64

Table 14 Comparison of sample characteristics and research findings with previous research on height fear 69

Table 15 Comparison of age, height fear severity, and trait anxiety between those in the fearful group who did and did not complete all three questionnaires 127

Table 16 Comparison of age, height fear severity, and trait anxiety between those in the fearful group who did and did not complete all three questionnaires 127

INTRODUCTION

Fear is an important emotional phenomenon that has historically served as an adaptive and protective survival enhancing emotion. While fear is considered a normal human emotion that is experienced across a person's developmental stages, fears that are dysfunctional and non-adaptive make up the main element of the wider category of anxiety disorders. In addition, features of fear and the related anxieties are often present, in some form, as the back-drop of many psychological disorders, making fear one of the most pervasive and influential emotions in the field of psychology.

DEFINITIONS AND RELATED ASPECTS OF FEAR

In the Diagnostic and Statistical Manual of Mental Disorders IV -Text Revision (DSM-IV-TR; American Psychiatric Association, 2000), the terms *fear* and *anxiety* are used interchangeably to encapsulate a set of physiological, behavioural, and cognitive responses associated with being uneasy or apprehensive towards particular stimuli. The diagnostic criteria for specific phobia, for example, are described in terms of the experience of both fear and anxiety when cued by the exposure to or anticipation of certain situations. Both of these concepts involve the awareness of physical sensations (e.g., palpitations and dizziness) and the awareness of the emotion itself, such as being nervous or frightened (Sadock & Sadock, 2007). However, there are important differences in the way that these concepts are understood and utilised within the field of psychological research and assessment of anxiety disorders.

Within this field, *fear* is the response towards an existing, present or potential threat, leading to avoidance, or fight-or-flight behaviours in some cases. Unlike fear, *anxiety* is a term used to capture people's reaction to the anticipation of future danger, as well

as the physiological unease that results from the conflict between the goals of approach and avoidance (Perkins, Kemp, & Corr, 2007; Sadock & Sadock, 2007). For example, a man who is about to make a public speech may become very nervous as a result of him anticipating a situation that he would rather avoid. Anxiety is also commonly characterised by cognitive reactions such as persistent worrying over potential unpleasant experiences, with elevated perceptions of the aversiveness of particular stimuli or situations (APA, 2000; Sadock & Sadock, 2007).

The category of *Anxiety disorders* in the DSM-IV-TR is used to describe cases where the experience of fear and anxiety is severe enough to cause psychological distress or impair daily functioning (APA, 2000). Within this category, *phobia* is a term used to describe exaggerated levels of fear and anxiety towards a particular stimulus or situation. People with phobias acknowledge that the level of their fear is exaggerated or unwarranted for the particular situation. However, any form of exposure to the feared stimulus (including seeing, hearing or imagining the presence of the stimulus) may be sufficient to elicit heightened physiological arousal and other symptoms of anxiety (Field, 2006a; Rachman, 1977). The DSM includes several types of phobias, including agoraphobia (anxiety over being in situations where escape might be difficult), social phobia (fear of embarrassment in social situations), and specific phobia (anxiety elicited by exposure to clearly discernible objects or situations; APA, 2000). Common types of specific phobias are those associated with animals, such as being fearful of dogs, snakes or spiders. Other subtypes include natural environmental fears such as being fearful in the presence of heights or a thunderstorm, as well as a blood-injection-injury type that covers fear of needles or sharp objects that may lead to tissue damage (APA, 2000).

Prevalence of Anxiety Disorders and Specific Phobias

Anxiety disorders are one of the most common mental disorders among both men and women in the western world, with research in America reporting that one in four people meet the diagnostic criteria for at least one anxiety disorder (Magee, Eaton, Wittchen, McGonagle, & Kessler, 1996). Specific phobia is a commonly occurring type of anxiety disorder, with a lifetime prevalence of 11.3% of the population (Fredrikson, Annas, Fischer, & Wik, 1996). Less severe or undiagnosed cases of specific phobia may interfere with the daily functioning of up to 19.9% of the population at any point in time (Fredrikson et al., 1996). Similar statistics are evident in New Zealand, where there is a 10.8% lifetime prevalence of specific phobias for people aged 16 and over, making it the most commonly occurring type of anxiety disorder in this country (Oakley-Browne, Wells, & Scott, 2006).

Cross-cultural comparisons have consistently found a much higher lifetime prevalence rate of specific phobia for women compared to men. While the exact ratios are dependent on the subtype of specific phobia that is examined, the prevalence rates for women are often double that for men, such as 14.1% lifetime prevalence of specific phobia for New Zealand women compared to 7.3% for New Zealand men (Oakley-Browne et al., 2006). The age of phobia onset is also dependent on its type, with fears from the blood-injection-injury subtype having a much earlier age of onset (around five to nine years) than situational fears that commonly develop in the mid-20s (Sadock & Sadock, 2007).

Course & Co-Morbidity of Anxiety Disorders & Specific Phobias

The experience of various types of fears is considered normative throughout development from childhood into adulthood. For example, a child's fear over the loss

of parental support or caution towards strangers can be considered as normative and developmentally-appropriate. Such fears become unhelpful and maladaptive if the intensity of the fear impairs personal and social functioning, or if they persist into later stages of development (Muris, 2007). For example, severe fear of losing parental support is characteristic of childhood separation anxiety disorder, and persistent fear towards strangers and unfamiliar social situations may develop into social phobia later in adolescence and adulthood (Sadock & Sadock, 2007). Conversely, a lack of the experience of fear during childhood is implicated in conduct disorders, which are characterised by externalising behaviours and disregard for social expectations (APA, 2000). As such, the experience of fear and anxiety can be a key component in the experience of a wide range of psychological difficulties. Furthermore, the very symptoms of anxiety may be relevant for more than one psychological problem. In the case of social phobia, the symptom of social withdrawal may also result from the lack of pleasure derived from making social interactions, which is indicative of depressive mood disorders (APA, 2000). It is also not uncommon for those with anxiety disorders to proceed to the use of substances such as Cocaine to self-medicate, leading to the high co-morbidity between anxiety disorders and substance-related disorders (Sadock & Sadock, 2007). This is especially the case given that the intoxication of excitatory substances, or withdrawal from narcotics, may also induce physiological symptoms that closely resemble that of anxiety.

Inherent in the high prevalence and co-morbidity of specific phobias is the variability in how such anxious and fearful patterns develop. Such variability means that no single etiological theory of anxiety and fear development can fully encompass all types of anxiety disorders. This area of discussion warranted a special issue of the journal *Behaviour Research and Therapy* (*see volume 40*), through which many of the authorities on this debate together provided a comprehensive review of the current understandings of the etiology of specific phobias.

The etiological understanding of the development of specific phobias comes predominantly from two schools of thought, namely, the associative and non-associative theories. The associative theory of fear posits that fear is a learned response which occurs towards stimuli that have in the past elicited aversive experiences (Davey, 1997). Thus, persistent fear develops as a result of a particular stimulus being associated with negative outcomes such as pain, injury, or psychological distress (Davey, 1997; Ollendick & King, 1991; Rachman, 1977, 2002). On the other hand, non-associative theorists posit that fear can develop without the occurrence of any aversive associations (Poulton & Menzies, 2002a). It is argued that most people show fear to a range of stimuli that have historically been dangerous to humans as a species (such as heights and deep water), and that persistent fear develops when these fears do not diminish over time (Menzies & Clarke, 1993b). With the recent renewal of interest towards the non-associative model of fear acquisition, researchers from both schools of thought have discussed the flaws of the opposing theory, and have also examined and refined the components of their own theories. Thus, an overview of the historical and current state of both the associative and non-associative accounts of fear development is warranted.

Associative pathways: Rachman's three-pathways theory

Rachman's three-pathways theory (Rachman, 1977) encapsulates three ways in which the association between a stimulus and an aversive experience can occur and subsequently produce persistent patterns of fear or phobia. The first pathway is through direct encounters where fearful responses are learned through the process of classical conditioning. The acquisition of fears can also occur indirectly through modelling (vicarious conditioning; e.g., Ollendick & King, 1991), as well as through

the transmission of information (informational conditioning; e.g., Field & Lawson, 2003; Graham & Gaffan, 1997).

Direct pathway: Classical conditioning

Post-Freudian theories of the etiology of specific phobias have been based on the conditioning mechanism. The theory of conditioning in explaining the acquisition of phobias is one that requires a traumatic or aversive experience to be associated with the to-be-feared stimulus. The primary premise for this is that aversive Unconditioned Stimulus (UCS; commonly an electric shock in laboratory experiments) naturally evokes an anxiety response (UCR; Unconditioned Response). When a non-feared stimulus (NS) has been sufficiently paired with the UCS, it can be conditioned into eliciting similar anxiety responses (Conditioned Response) even without the presence of the UCS. As demonstrated by Watson and Rayner (1920, cited in Field, 2006a), a previously non-feared object (a white rat) elicited fear reactions after being repeatedly associated with an aversive unconditioned stimulus (a loud banging noise). Similar laboratory studies with animals have provided strong evidence that fear can be conditioned following repeated pairings of a CS with a UCS (Mineka & Cook, 1986). While the conditioning principle suggests that a greater number of repeated aversive exposures results in greater levels of fear (Rachman, 1977), research has also demonstrated that a single, intense direct conditioning event may be sufficient to condition long-lasting fear responses (Dollinger, O'Donnell, & Staley, 1984; Öhman, Eriksson, & Olofsson, 1975). Findings from retrospective studies have supported the conditioning framework of fear development. Up to 91% of children with fear towards dogs have had at least one painful or aversive encounter with dogs (Doogan & Thomas, 1992). Conditioning events are also commonly described as being the origin of other animal-type fears (King, Gullone, & Ollendick, 1998) and agoraphobia (Merckelbach, de Ruiter, van den Hout, & Hoekstra, 1989).

Despite the empirical evidence that supports the capacity of CS-UCS pairings in eliciting fear, there are significant limitations to the classical conditioning theory in explaining the many forms of fears that occur in real-life settings. There are certain fear types that are consistently and cross-culturally more common, many of which are not likely to be associated with an aversive UCS, such as spiders, flying and thunderstorms. These stimuli have been found to be more readily feared compared with knives and electric outlets, even when the latter stimuli would have greater chances of eliciting pain (Davey, 1997). Such uneven distribution of fears suggests that UCS-CS associations are by themselves insufficient in establishing fears and phobic responses. Indeed, a longitudinal study that followed a birth cohort of 1037 people revealed that traumatic experiences with heights (e.g., falling from a high place causing injury) occurring between the ages of 3 and 9 did not predict the onset of height fear at age 11 or phobia at age 18 (Poulton, Davies, Menzies, Langley, & Silva, 1998). In addition to results suggesting that associative events are insufficient in producing fear, research has also found that they are unnecessary. Many adults with phobias do not recall having personally experienced aversive conditioning events that preceded their fear towards stimuli such as spiders (Davey, 1992), heights, and water (Menzies & Clarke, 1993a). Similarly, a significant number of children with animal phobias and their parents do not report having such conditioning events to be the cause of the child's fear (e.g., King, Clowes-Hollins, & Ollendick, 1997; Merckelbach, Muris, & Schouten, 1996).

In light of these findings, the traditional conditioning theory has been repeatedly revised throughout the last few decades (Field, 2006a; Rachman, 1977), and has incorporated neo-conditioning perspectives as a response to the identified limitations of classical conditioning theory. Neo-conditioning theories have been established out of the recognition that fear can be conditioned without the contiguity of CS and UCS. In other words, negative outcomes such as anxiety need not be experienced at the

time of exposure to a stimulus in order for fear to develop (de Jong, Muris, & Merckelbach, 1996; Rachman, 1991). One of the theories consistent with the neo-conditioning perspective suggests that, after a non-fearful encounter with a stimulus, subsequent revaluations of the dangerousness or aversiveness of the stimulus can establish persistent fear responses towards that stimulus – a process termed *UCS revaluation* (Davey, 1989). Research has demonstrated this effect by associating the visual stimulus of a simple triangle (CS) with short 1000Hz tones (UCS), and by manipulating the strength of the UCS. Participants' responses (CR) were measured in terms of their skin conductance after each exposure to the UCS. After six repeated associations between the visual stimulus and a mild, non-noxious 65dB tone, the strength of the tone was gradually elevated to 115dB through 12 presentations of the tone in the absence of any visual stimuli. Subsequently, presentations of the visual stimuli alone produced a greater CR compared to that prior to the strength of the UCS being elevated (White & Davey, 1989). This highlights how fear responses can be conditioned after the exposure to (i.e., in the absence of) the CS, and serves to explain why people who are fearful of a particular stimulus may not have experienced fear towards it in the first encounter. The finding that the revaluation of the UCS can alter the capacity of the CS to produce fear and anxiety also suggests that an enduring link between UCS and CS can be established, and supports the role of associative UCS-CS encounters in the development of fear.

The neo-conditioning perspective has also incorporated people's ability to engage in cognitive processes that influence whether fear acquisition occurs (Rachman, 1991). An example of such processes is when an individual develops an understanding of the contingency between the CS and the fear-provoking UCS – in other words, the likelihood for the CS to be associated with a UCS, subsequently eliciting fear (Rescorla, 1968). The concept of contingency highlights the idea that, while UCS-CS associations are important in the conditioning of some fears, it is also important to

consider situations where the CS is not paired with a UCS. For example, if the experience of negative outcomes occurs randomly irrespective of the exposure to a particular stimulus or situation, such low contingency between the UCS and CS will be unlikely to establish an association between the stimulus and negative outcomes (Rachman, 1991). This was demonstrated in a laboratory study of rats, where the level of fear conditioned (measured through observing behavioural suppression) was proportional to the probability of electric shock (UCS) occurring when a tone (CS) was presented. Furthermore, when the probability of receiving electric shocks was the same for when the tone was present or absent, no conditioning of fear towards the tone was observed (Rescorla, 1968). Thus, developing an understanding of the UCS-CS contingency will likely affect the capacity for fear to be conditioned to a stimulus.

Following the theory of contingency, with slight differences in its rationale, is that of latent inhibition, another principle highlighted by neo-conditioning theory. The principle is that the conditioning of fear to a particular stimulus is made more difficult, and thus inhibited, with any prior non-aversive exposure to that stimulus (Lubow, 1973). Laboratory studies have demonstrated this effect in a number of animals as well as humans, using measures such as licking rate, bar pressing, and avoidance as indicators of anatomical and behavioural change (see Lubow, 1973). In the naturalistic setting, a person who frequently experiences non-aversive encounters with the CS (e.g., enjoying playing with dogs) should be less likely to become fearful of dogs in the future. Such inhibitory operations can explain why some people who experience traumatic associations with a CS do not consequently become fearful. Together, inhibitory processes and the development of a contingency between the CS and UCS can help evaluate the expected dangers associated with being exposed to the CS, thus playing a role in the revaluation of any initial CS-UCS pairings and in the expression of the conditioned fear (Davey, 1989; Rachman, 1991).

Indirect pathway: Vicarious conditioning

Studies with humans and animals have supported the idea that fear can be acquired through modelling. A laboratory study on vicarious conditioning measured toddlers' fear expression and avoidance towards fear-relevant stimuli (toy snakes or toy spiders) before and after witnessing their mother display fearful expressions towards the stimuli, and found that greater levels of fear had been acquired vicariously by the toddlers (Gerull & Rapee, 2002). Similar findings have been replicated with older children of 7 - 9 years, where pairing pictures of a particular animal with pictures of fearful expressions significantly increased the time it takes for the children to approach a box that is believed to contain that animal (Askew & Field, 2007). Retrospective studies have also shown that 53% (n = 16) of parents believe vicarious factors to be most influential to their child's development of dog phobia (King et al., 1997).

Through the same mechanism, vicarious learning can also serve as a protective factor against the acquisition and maintenance of fear as non-fearful reactions toward a stimulus can be modelled through observation (Emmelkamp, 2004). This was demonstrated through a laboratory study on monkeys where those who observed other monkeys behaving non-fearfully towards snakes were significantly less likely to develop behavioural aspects of fear compared to those who observed fearful reactions (Mineka & Cook, 1986). Through these findings, it can be seen that vicarious learning has profound influences on the acquisition, maintenance, and alleviation of specific fears.

Indirect pathway: Informational conditioning

Acquiring information about the dangers associated with a particular stimulus can be sufficient in triggering fearful reactions towards that stimulus (Rachman, 1977). Such forms of social learning typically originate as stories or warnings told by parents,

peers, or though the media. Receiving such information can elevate the perceived dangerousness of particular stimuli (Davey, 2006), as well as produce enduring patterns of behavioural inhibition (Field, 2006b). Verbally transmitted information also has a significant role in the revaluation of a UCS after an associative encounter. For example, a case report noted that, despite having a non-fearful encounter with a large tropical spider, subsequent information about the potential dangers of the situation had led the person to develop a severe spider phobia (Davey, de Jong, & Tallis, 1993). A later study by Field and Storksen-Coulson (2007) demonstrated that combining both aversive information transmission and direct encounters with the CS produced a much greater level of self-reported fear and behavioural avoidance compared to exposure to either of these experiences alone. Thus, the social transmission of information has been demonstrated to influence the revaluation of the initial UCS-CS associations, as well as having a significant impact on the development of fear.

Despite the empirical support for the associative perspective in the development of fears and phobias, associative theorists are still faced with the need to address the finding that a significant number of people with phobias have no recall of past associative events that may have led to the acquisition of fear (e.g., Kleinknecht, 1994; Menzies & Clarke, 1993a). Specifically, this challenges the associative perspective's reliance on the presence of both the CS and UCS in order for fear to be conditioned, since the trigger of fear or anxiety (i.e., UCS) often cannot be identified. Some authors re-emphasize the concept of UCS revaluation that initial encounters with a stimulus do not need to elicit fear, as such an encounter can be revaluated through subsequent experiences (Davey, 1989; de Jong et al., 1996). Others have drawn attention to the concept of *interoceptive* conditioning, where the triggers of fear are internally experienced through, for example, the excitation of internal sensory receptors in the gut and lungs (Mineka & Öhman, 2002). Essentially, any unseen

internal processes that occur during a CS encounter (e.g., physiological arousal that are synonymous with fear itself) are considered to constitute UCSs that produce fear. Such a way of conceptualising associative theories was seen as an attempt to fit all cases of fear acquisition into the conditioning framework, and to make the associative perspective all-encompassing and non-falsifiable (Poulton & Menzies, 2002a). In light of this, non-associative accounts of fears and phobias have been proposed to complement the associative perspective and offer a theory for conceptualising the occurrence of fears that do not arise through conditioning pathways.

Non-Associative Pathways

While acknowledging the role of associative events in conditioning fear to various contemporary stimuli (e.g., dentists, driving), some authors emphasize the biological relevance of fear towards evolutionary-relevant stimuli that have historically been threatening to human life (Menzies & Clarke, 1995b; Poulton & Menzies, 2002a), such as heights, water, early separation, and strangers (Menzies & Harris, 1997). This perspective closely resembles the theory of biological preparedness, which argues that evolutionary-relevant stimuli are more readily feared than others, requiring less associative encounters to be experienced before persistent fear develops (Mineka & Öhman, 2002). However, the emphasis of the non-associative perspective is that, unlike the theory of preparedness where associative experiences would still be required, the expression of fear towards certain stimuli are innate, and can occur without the experience of associative encounters (Poulton & Menzies, 2002a). Likewise, it is argued that most people will experience fear towards a range of such evolutionary-relevant stimuli on their first encounter (Menzies & Clarke, 1995b), with genetically-based differences in the severity of such fears (Menzies & Harris, 2001). For example, a laboratory study on height fear with infants of humans and land-dwelling animals (who presumably have very limited prior exposure to

heights) observed a consistent pattern of avoidance and distress towards the deep side of an artificial visual cliff, while preferring to move towards the shallow side (Gibson & Walk, 1960).

Such fears that are experienced during infancy and early childhood will ideally habituate or diminish through developmental processes over time. According to the non-associative view, persistent patterns of fear develop when these innate fears fail to habituate (Menzies & Clarke, 1995b). This can occur if there is a lack of safe, non-frightening exposure to the feared stimulus during the developmental process. There could also be genetically-based differences in people's capacity to habituate their fears, thus certain individuals may require more non-aversive encounters before habituation occurs (Menzies & Harris, 2001; Poulton & Menzies, 2002b).

The non-associative view has provided at least two other explanations of people's fears within this field of research. Namely, it emphasizes the role of non-associative traumatic events, as well as the possibility that a person has simply always been fearful. The non-associative traumatic event pathway highlights the possibility that previously habituated fears may re-emerge due to exposure to environmental stressors (Poulton & Menzies, 2002b), and thus people may express fear towards particular stimuli without having an external UCS eliciting the fear. In support of this theory, a prospective New Zealand study found that respondents who reported an *emergence* of fear towards heights at the age of 18 were more likely to have reported the experience of non-specific stress (involving family, school or personal health) during childhood or adolescence (Poulton, Waldie, Craske, Menzies, & McGee, 2000). Although this study could not eliminate the possibility of conditioning events in producing fear, it highlights the possible role of dishabituation in explaining the onset of fear through non-associative pathways (Menzies & Harris, 1997; Poulton & Menzies, 2002a). Another possibility within the non-associative framework is that

people could have always been fearful due to the failure to habituate the fear that was experienced since infancy and childhood (Poulton & Menzies, 2002b). This stems from the finding that some people cannot remember a time when they were not fearful of the stimulus, or that they recall being fearful of a stimulus on their first encounter (i.e., before any prior exposure had occurred). In two studies, this non-associative pathway to fear was endorsed by as many as 56% (*n* = 28; Menzies & Clarke, 1993a) and 78% (*n* = 28; Graham & Gaffan, 1997) of parents of water-phobic children to be most relevant to their child's fear, supporting the primacy of non-associative pathways for evolutionary-relevant fears (Poulton & Menzies, 2002b). In addition to water, the fear of heights is also considered to have high evolutionary relevance (Poulton & Menzies, 2002a).

Research on the Fear of Heights

The fear of heights has been used in research to explore the role of non-associative accounts in the development of fears and phobias. Since the development of a questionnaire that captures non-associative accounts of fear onset (Origins Questionnaire; Menzies & Clarke, 1993b), retrospective studies have revealed that a majority of people with height fear believe non-associative factors to be the most prominent pathway to their fear. For example, in a study with 148 adults who met the DSM-III-R criteria for height phobia, 56% (*n* = 83) of the sample either reported having always been fearful of heights, or described fear-onset events that were consistent with the non-traumatic conditioning event pathway (Menzies & Clarke, 1995a). In comparison, a classical conditioning pathway was relevant for less than 12% (*n* = 17) of cases. Combined with the vicarious and informational conditioning pathways, associative accounts of height-fear onset were attributed to 31% (*n* = 46) of the cases (Menzies & Clarke, 1995a). These results were replicated with a student sample of 54 who reported having very high levels of height fear on the Acrophobia

Questionnaire (AQ; Cohen, 1977), where nearly 56% (*n* = 30) of participants were categorised into a non-associative pathway, compared to 37% (*n* = 20) into one of the three associative pathways (Menzies & Parker, 2001).

It is possible that some of the fearful participants failed to report any prior non-anxious encounters with heights that may have subsequently been revaluated to produce height fear, which would have underestimated the influence of associative events in the development of height fear in Menzies and Clarke's (1995a) sample. In an attempt to examine the influence of such neo-conditioning processes on the occurrence of height fear, Menzies and Clarke's (1995a) study was replicated in a student sample with additional items in the study questionnaire designed to elicit participants' recollection of past non-anxious encounters and the subsequent revaluation of these events. Despite such efforts, no instances of UCS revaluation were identified, as none of the 54 height-fearful participants reported that their perception of the threat associated with any prior encounters had changed since the event (Menzies & Parker, 2001).

Other studies that have examined the influence of past associative events regarding heights have found that non-fearful people may have previously experienced aversive encounters with heights that elicited greater levels of fear compared to those experienced by fearful people, yet they do not develop persistent fear or phobic reactions towards heights (Menzies & Parker, 2001; Rachman, 1977). Furthermore, there are often no significant differences between height-fearful and non-fearful respondents in the number of past aversive encounters with heights (Menzies & Clarke, 1993b; Menzies & Parker, 2001). A prospective study has shown that non-height-fearful people had *more* traumatic events involving heights compared to height-fearful people, a finding that is opposite to that expected from associative theories (Poulton et al., 1998). Combining these lines of evidence, the role of the

associative pathway in conditioning fear, at least towards heights, seems to only provide a partial explanation of fear onset.

A further issue with height fear research, and indeed research on fear onset in general, is that much of the data provided in support of any particular position are largely based on retrospective self-reports or parental reports, some of which require the recall of events that occurred many years ago. Although comparisons of research findings from retrospective and prospective studies on height fear show remarkable similarities (e.g., Menzies & Parker, 2001; Poulton et al., 1998), the results of retrospective studies need to be considered in light of the potential errors and biases that may jeopardise the reliability of retrospective recall.

Reliability of Retrospective Accounts

Retrospective evidence is a major source of empirical information that is used to support and criticize both the associative and non-associative theories of fears and phobias. Researchers have tended to rely on participant retrieval and integration of emotional, physiological, and autobiographical memory in order to determine whether an anxiety-provoking associative event played a role in the acquisition of their fear (e.g., Menzies & Parker, 2001; Taylor & Deane, 1999). As retrospective data are also used to help determine whether certain feared stimuli are evolutionary-relevant or –neutral (e.g., Poulton & Menzies, 2002a), the unreliability of retrospective data would likely threaten the legitimacy of any conclusions made regarding the evolutionary relevance of fear. Thus, the extent to which people's memory of fear-related events is subject to distortions and biases is of particular importance to this area of research and the present study.

It has been found that students' reports of past classical conditioning experiences were described with higher levels of certainty than reports of other pathways (Withers & Deane, 1995), suggesting that traditional conditioning experiences are more readily recalled and described in surveys and interviews compared to indirect pathways. Furthermore, the implication of traumatic associative experiences being more readily remembered is that mild, non-aversive encounters are comparatively less memorable (White & Davey, 1989). Another source of memory biases is the tendency for people to recall mood-congruent memories, where the memories of emotions that have more resemblance to the person's current mood are more readily accessed (Henry, Moffitt, Caspi, Langley, & Silva, 1994). The implication of mood-congruence is that subjective perception of fear or anxiety levels may be elevated for people with certain mood disorders or anxiety disorders, although the magnitude at which such psychopathologies jeopardise the authenticity of these reports is yet to be thoroughly investigated (Coles, Turk, & Heimburg, 2007).

In addition to the errors and biases that may distort people's memories of past experiences, research has also documented the normal limitations of human memory. Specifically, people may be unaware of the conditioning encounters that occurred before the age at which autobiographic memory can be encoded and recalled, resulting in so-called childhood amnesia (Mineka & Sutton, 2006). Menzies and Harris (1997) suggest that such capacities develop after the age of two, but even when the capacity to register autobiographical events has developed, the detail and complexity of these early memories is very limited (Mineka & Sutton, 2006). Being unable to recall ambiguous associative events may add to some people's belief that that they have always been fearful, a belief that has provided much of the support for the evolutionary non-associative view of fear acquisition (Poulton & Menzies, 2002b).

To date, there has been only one study that has explicitly investigated the potential instability of retrospective accounts of fear onset. Taylor, Deane, and Podd (1999) used the Origins Questionnaire (OQ; Menzies & Clarke, 1993b) with a community sample reporting some degree of driving fear to examine the stability of retrospective accounts of driving-fear onset across a 12-month period. The 85 participants who reported driving-related fears completed the OQ at the start of the 12-month period, in which they described events related to the onset of their fear. After 12 months, the participants completed a further questionnaire on fear onset, but due to practical considerations they responded to a single question about fear onset rather than the full 24-page OQ. After 12 months, 46% of the participants had ascribed to a different fear-onset pathway than what was originally described. The highest proportion of change occurred for the group of 11 participants who initially could not remember how they became fearful of driving, from which 9 participants ascribed to either a conditioning or non-conditioning fear-onset pathway after 12 months. Similarly, 11 out of 25 participants who initially ascribed to an associative pathway had changed their pathway ascriptions to either a different associative category, or to a non-associative pathway after one year. Thus it appears that over a period of 12 months, people have the potential to either remember past experiences or forget previously remembered events, highlighting the issue that the accuracy of retrospective data collected at any one point in time can be affected by the presence of memory limitations and errors.

In order to accurately evaluate the effect of potential memory errors on the instability of retrospective recall, it is important to identify and distinguish factors that may cause a genuine change in people's attitudes and experiences toward their fears, and to consider how these may alter the report of past events. As such, the instability of reports observed by Taylor et al. (1999) is likely to be superimposed on actual changes in the participants' level of fear across the retest period. As previously

mentioned, events involving the feared stimulus that occur after the development of fear may still be etiologically significant through the process of UCS revaluation. Taylor et al. (1999) investigated the potential link between the instability of fear pathway ascriptions and the occurrence of intervening driving-related events. Although chi-square analyses were inconclusive due to low *n* in some cells, it was observed that 5 out of the 7 participants (71%) who reported intervening driving-related events in between assessment points (including being in a motor vehicle accident, or seeing one through the media) had a change in pathway ascriptions, compared to 43% (19 out of 44) of those without intervening events. While the occurrence of intervening events appeared to have some influence on the changes in pathway ascriptions, the researchers did not find other significant changes in participants' fear severity or trait anxiety that may explain the pathway changes (Taylor et al., 1999).

However, the instability of retrospective recall found by Taylor et al. (1999) may be partly attributed to the low test-retest reliability of the instrument used to assess fear onset and variations in study procedures. One of the major limitations of the study by Taylor et al. was that the questionnaire used to determine participants' fear onset pathway changed due to practical considerations at the one-year follow-up. Specifically, in the initial OQ, participants were given the opportunity to provide detailed information about driving-related fearful situations that they had encountered, including the level of anxiety experienced, and subsequent additional encounters. At retest one year later, the questionnaire was shortened significantly due to concerns over low compliance rates with repeating the same 24-page OQ. In this shortened version, participants were given brief descriptions of the characteristics of each onset pathway and were asked to select the description that applied best to them. While both of these methods may be legitimate means of exploring the pathway of fear onset, having such differences in measurement across time likely amplifies the

magnitude of any instability. Thus, despite having such dramatic results highlighting a major limitation to retrospective studies on fear onset, these findings need to be replicated in a study that exerts greater control over the variations in measurement over time.

THE PRESENT STUDY

Having identified several aspects related to the etiology of fears and phobias that still warrant further investigation, this study aims to provide an additional piece of empirical data to contribute to the wider debates around such issues. The present study is a systematic replication of Menzies and Parker's (2001) study on the etiology of height fear, and an extension of Taylor et al.'s (1999) study on the instability of retrospective recall of fear-related experiences. It involves three administrations of the same set of assessment procedures on two groups of height-fearful and non-fearful student participants over a period of 12 months.

Each individual assessment point can be regarded as a systematic replication of Menzies and Parker's (2001) study, which also targeted the acquisition of height fear. Thus, the present study has the potential to replicate their findings in terms of the proportion of participants who ascribe to particular pathways of fear onset. Based on previous research on height fear (Menzies & Clarke, 1993b; Menzies & Parker, 2001), the present study's first hypothesis predicts that non-associative pathways to height-fear onset will be more commonly endorsed than associative conditioning pathways.

The second and most significant purpose of the present study is to address the need to replicate the results obtained by Taylor et al. (1999) using a stable method of ascertaining people's descriptions of their fear onset over time. The present study examines the extent to which retrospective accounts of past experiences are stable

over time, using heights as the target fear type. Based on the driving-fear research conducted by Taylor et al. (1999), the present study's second hypothesis predicts that changes in participants' ascription of height-fear onset pathways over a 12-month period will be observed. However, the extent of these changes is predicted to be less than that reported by Taylor et al. (1999), primarily because the present study has greater consistency in measurement over time.

The present study also makes a third, exploratory hypothesis regarding the influence of intervening events on the stability of fear severity and onset pathway ascriptions. This hypothesis is important within the context of this study because there is a need to distinguish erroneous instabilities in retrospective report from genuine changes that had occurred for the participants. Accordingly, it is predicted that the nature of intervening events would lead to changes in fear severity that is logical and consistent with that expected from the associative and non-associative models. That is, fearful exposures would condition greater aversiveness and fear towards heights, while non-fearful exposures would contribute to the habituation of the fear and would serve to reduce height fear severity. Based on the findings reported by Taylor et al. (1999), the present study also predicts that those who experience height-related intervening events are more likely to change their pathway ascriptions.

In summary, the present study investigates the following hypotheses:

1 Height-fearful participants will more likely ascribe to a non-associative pathway to the onset of fear than an associative pathway.
2 Some changes in participants' pathway ascriptions will occur during the 12-month retest period.
3 The occurrence of height-related intervening events between two times of testing would logically relate to any changes in the report of fear severity or pathway ascriptions.

METHOD

OVERVIEW

Prior to the study proper, a screening phase (Phase 1) was conducted to assess the frequency of a range of fear types in the student sample. This informed decisions on which fear type to use for the main study, with consideration given to the number of potential participants who have the particular fear type, as well as the relevance of the fear type to the debate surrounding the pathways to fear acquisition. At the same time, the screening phase also identified participants who could be recruited for the fearful and non-fearful control groups in the main study. The main study (Phase 2) collected information from participants at three points in time over 12 months. That is, there was an initial data collection immediately after the screening phase (Phase 2: Time 1), and two subsequent follow-up assessments 3 months (Phase 2: Time 2) and 12 months (Phase 2: Time 3) after the initial data collection.

PHASE 1: SCREENING AND PARTICIPANT SELECTION

PARTICIPANTS

Internal undergraduate psychology and media studies students were approached in class and invited to take part in the study. Survey packs that included an Information Sheet, screening questionnaire (see below), and freepost return envelope were prepared (see Appendix A). Of about 150 packs that were distributed to interested students, 87 were completed and returned by internal students. This group had a mean age of 22.23 years (*SD* = 8.51), and consisted of 20 men (22.99%) and 67 women (77.01%). An electronic version of the questionnaire was also posted on a web-based communication forum for extramural undergraduate psychology students,

and 99 responses were received from this extramural group. This group had a mean age of 36.24 years (*SD* = 10.73), and consisted of 7 men (7%) and 92 women (92%). Combining both the internal and extramural groups gave a total sample of 185 students. There were 156 women (84%), and the group had a mean age of 29.80 years (*SD* = 12.00).

MEASURES

Fear Survey Schedule-Second Edition (FSS-II)

In order to select an appropriate fear type as the focus of the study, participants' levels of fear towards different stimuli were screened using the Fear Survey Schedule-Second Edition (FSS-II; Geer, 1965; see Appendix A). The FSS-II asks participants to rate their current level of fear towards a range of stimuli using a seven-point Likert scale, using the anchors 0 (*None*),1 (*Very little fear*), 2 (*A little fear*), 3 (*Some fear*), 4 (*Much fear*), 5 (*Very much fear*), and 6 (*Terror*).

Three versions of the Fear Survey Schedule have been developed. The first FSS, developed by Akutagawa (1956, cited in Geer, 1965), included 50 items representing commonly feared stimuli. Geer (1965) refined these items by empirically filtering items from a larger pool of 111 stimuli, giving a final group of 51 items for the FSS-II. A further development, the FSS-III (Wolpe & Lang, 1964), was published before the FSS-II. This third version was tailored for use within the clinical setting, with items representing those that are commonly associated with neuroses and neurotic anxiety traits (Wolpe & Lang, 1964).

The FSS-II was used in the present study as an exploratory screening measure to identify the common fear types and to select participants. Two items were added to capture more of the potential fears of participants. One of the items was 'Dentists',

which is considered an evolutionary-neutral stimulus, and has been used in research to compare differences in the acquisition of evolutionary-relevant and –neutral fears (Poulton et al., 2000). This item is also included in the FSS-III under the category of 'Tissue damage, illness and death, and their associations' (Wolpe & Lang, 1964). Similar items in the FSS-II belonging to that category include hypodermic needles, dead bodies and cemeteries. Another item was added to allow participants to freely identify a fear type that was relevant for them.

Scoring

The self-administered FSS-II takes about five minutes to complete. The total score is the sum of all of the ratings given for each item, and can range from 0-318, with a higher score indicating higher levels of fear. Total scores can provide information for analysis of group differences, but had little meaning and purpose in the selection of participants into the current study.

Psychometric properties

A normative sample of 270 undergraduate students completed the FSS-II, which demonstrated high internal consistency (Kuder-Richardson's alpha = 0.94; Geer, 1965). The FSS-II also significantly correlates with other anxiety scales and laboratory behavioural testing of anxiety responses, which supports the convergent validity of the item list as well as the anchors for the response scale (Geer, 1965). Factor analytic studies have identified several major areas captured by the FSS-II and FSS-III. These categories are largely reflected in the categories described by Wolpe and Lang (1963), which included animal-, interpersonal-, and death-related fears. A factor analysis of the FSS-II by Rubin, Katkin, and Weiss (1968) identified water, death and illness, social competence, and social interaction as the major factors included.

Outcome of the Screening Phase

The mean total FSS-II score obtained was 85.48 (*SD* = 38.90) for men, and 98.56 (*SD* = 35.82) for women. The overall mean total score was 97.11 (*SD* = 36.27). This is comparable to the original results by Geer (1965), who reported a mean total score of 100.16 (*SD* = 36.11).

The most frequently and strongly feared item was “death of a loved one”, for which 45% of participants rated 5 (*very much fear*) or 6 (*terror*) on the 0-6 scale. Other death- and illness- related items also ranked highly in terms of the percentage of participants rating 5 or 6 for that item. Fear of “suffocation” was also prominent, with 26% of participants rating 5 or 6, while the least-feared items included “worms”, “God”, and “thunderstorms”. A table of results detailing the percentage of ratings for each of the items is provided in Appendix B.

The results from the screening phase informed the decision about the fear type to use for the main study. Consideration was given to the relevance of the fear type to the debate surrounding specific phobias and their etiology. It was also important to have as large a number of participants as possible for the fearful and non-fearful groups for the study. The criterion adopted for selecting the fearful group was for participants to rate either 5 (*very much fear*) or 6 (*terror*) for the chosen fear type. Conversely, selection of non-fearful participants required a rating of either 0 (*no fear*) or 1 (*very little fear*) for the chosen fear type. Nearly 18% (*n* = 33) of participants reported high levels of fear towards heights, which was the fifth highest fear type to be rated 5 or above. Fear of heights is a commonly occurring subtype of specific phobia, and has particular relevance to recent discussion about the non-associative models of fears and phobias. Thus fear of heights was selected as the target fear type for the present study.

PHASE 2: STUDY PHASE

The present study examined both between-group and within-group differences in height-related fears and experiences over time. To test these differences, participants were asked to complete a questionnaire about fear onset and severity at three points in time over a period of 12 months. Namely, there was an initial data collection (Time 1), and subsequent three-month (Time 2) and twelve-month (Time 3) follow-ups.

PARTICIPANTS

TIME 1

From the initial participant pool of 185 who completed the screening questionnaire, 33 nominated a rating of 5 or 6 for heights, indicating a self-reported *very high* or *terror* level of fear towards heights, respectively. These students were invited to participate as the height-fearful group, and were sent a survey package by mail containing an Information Sheet, Consent Form (see Appendix D), and the fear group study questionnaire (see Appendix E), described in the following section. Of these 33, 30 participants completed and returned the questionnaire, resulting in a response rate of 90%. This group had a mean age of 33.87 years (*SD* = 12.61), and was comprised of 28 women (93.33%) and 2 men (6.67%).

A non-fearful comparison group was also selected from the initial participant pool. There were 54 students who endorsed a score of 0 or 1 for heights, reporting that they had *no fear* or *very little fear* towards heights, respectively. These students were sent a survey package that contained an Information Sheet, Consent Form, and the control group study questionnaire (see Appendix F). Of the 54, 47 participants

completed and returned the questionnaire, resulting in a response rate of 87%. This group had a mean age of 28.32 years (*SD* = 10.28), and was comprised of 37 women (78.72%) and 10 men (21.28%).

The overall sample included 77 undergraduate psychology and media studies students. The mean age was 30.48 years (*SD* = 11.49), and there were 65 women (84.42%) and 12 men (15.58%). Table 1 shows a summary of group demographics, fear severity, and trait anxiety data. A chi-square analysis that would examine the difference in gender proportion between the fearful and non-fearful groups was not conducted because the frequency count in one of the cells was less than the recommended value of five or above (Pallant, 2007), as there were only two men in the fear group. Nevertheless, there was a clear majority of women in both groups. An independent-samples t-test showed that the fearful participants were significantly older than the non-fearful participants, $t(75) = 2.10$, $p < .05$, $d = .50$, by five years on average. Also, participants from the internal group were significantly younger than the extramural participants, $t(63.10) = 9.38$, $p < 0.01$, $d = 1.38$. However, the difference in the proportion of internal and extramural participants between the fearful and non-fearful groups was not significantly different, $\chi^2(1,77) = 1.82$, $p = 0.18$, $\phi = 0.15$.

To assess the groups for severity of height fear, participants completed the anxiety and avoidance subscales of the Acrophobia Questionnaire (AQ; Cohen, 1977). Table 1 provides the mean scores and standard deviations for the sample group. As expected, the fearful group scored significantly higher than the non-fearful control group for the severity of height fear in terms of levels of anxiety, $t(75) = 12.45$, $p < .05$, $d = 2.95$, and avoidance, $t(75) = 10.32$, $p < .05$, $d = 2.44$. However, unlike previous studies by Menzies and Parker (2001) and Taylor et al. (1999), the fearful group had significantly higher levels of trait anxiety compared to the non-fearful group, $t(74) =$

3.53, $p < .01$, $d = .84$, as indicated by participants' scores on the Trait scale of the State-Trait Anxiety Inventory, Form Y-2 (STAI-T-Y2; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983).

TABLE 1
Study Group Composition and Characteristics at Time 1

	Internal	Extramural	Total sample
Fear group	*n* = 10	*n* = 20	*n* = 30
Number of women (%)	9 (90.00)	19 (95.00)	28 (93.33)
Mean age in years (*SD)*	20.40 (3.98)	40.60 (9.60)	33.87 (12.61)
AQ - Anxiety (*SD*)	48.90 (14.52)	60.45 (19.51)	56.60 (18.58)
AQ – Avoidance (*SD*)	11.80 (3.22)	13.95 (7.21)	13.23 (6.20)
STAI-T (*SD*)	46.10 (6.23)	47.74 (10.87)[a]	47.17 (9.44)[b]
Non-fear group	*n* = 23	*n* = 24	*n* = 47
Number of women (%)	18 (78.26)	19 (79.17)	37 (78.72)
Mean age in years (*SD)*	21.61 (4.81)	34.75 (10.05)	28.32 (10.28)
AQ - Anxiety (*SD*)	15.04 (14.88)	12.17 (7.82)	13.57 (11.77)
AQ – Avoidance (*SD*)	3.17 (3.63)	1.63 (1.95)	2.38 (2.97)
STAI-T (*SD*)	43.09 (8.61)	35.79 (8.69)	39.36 (9.32)
Total sample	*n* = 33	*n* = 44	*n* = 77
Number of women (%)	27 (81.82)	38 (86.36)	65 (84.42)
Mean age in years (*SD)*	21.24 (4.55)	37.41 (10.17)	30.48 (11.49)

SD = standard deviation. Acrophobia Questionnaire (AQ) Anxiety scale; possible score range from 0-120, higher score indicating greater level of height anxiety. Acrophobia Questionnaire (AQ) Avoidance scale; possible score range from 0-40, higher score indicating greater level of height avoidance. Trait scale of the State-Trait Anxiety Inventory (STAI-T); possible score range from 20-80, higher score indicating greater level of trait anxiety. [a] n = 19 due to one case of pairwise exclusion. [b] n = 29 due to one case of pairwise exclusion.

TIMES 2 & 3

All of the 30 fearful and 47 non-fearful participants who returned the first questionnaire were invited to participate in the subsequent assessments at 3 months (Time 2) and 12 months (Time 3) after the Time 1 questionnaire. At Time 2, there were 24 responses from the fearful group (80.00% response rate), and 37 responses

from the non-fearful group (78.72% response rate). Only one participant (4.12%) in the fearful group was male, and there were 5 men (10.64%) and 42 women (89.36%) in the non-fearful group. At Time 3, there were 26 responses from the fear group (86.67% response rate), 24 (92.31%) of which were from women. There were 40 responses from the non-fearful group (85.11% response rate), with 9 (22.50%) men and 31 (77.50%) women. Table 2 shows the attrition of participants over the three points of data collection.

TABLE 2
Participant Attrition across the Three Times of Data Collection

	Fearful group	Non-fearful group
Total at T1	30	47
Total at T2	24	37
Withdrawn at T2	6	10
Returned at T3	4	8
Did not return at T3	2	2
Total at T3	26	40
Withdrawn at T3	2	4
N who returned all three questionnaires	22	33

Independent samples *t*-tests were conducted to examine the differences between those who completed all three questionnaires and those who did not (i.e., did not complete either one or both of the Time 2 and Time 3 questionnaires). This was important because while all participants were included in testing Hypothesis 1, only those who completed all three times of data collection were involved in testing Hypothese 2 and 3. Appendix G provides the mean AQ and STAI-T scores and the mean age of those who did and did not complete all three times of data collection. The only significant difference was that those in the non-fearful group who completed all three questionnaires were significantly older than those who did not complete the full set of questionnaires, $t(45) = 2.61$, $p < .01$, $d = .85$. No other significant differences in terms of fear severity or trait anxiety were found in the fearful or non-fearful groups between those who did and did not complete all three questionnaires.

MEASURES

The questionnaire used in the present study was a compilation of instruments that provided a comprehensive measure of participants' height-related fears and experiences. Different versions of the study questionnaire were tailored for each of the study groups so that the questions would be more relevant to the participants. Specifically, participants in the fearful group completed a 21-page questionnaire asking about possible pathways of fear onset, severity of height anxiety and avoidance, trait anxiety, means of help-seeking, and impact on daily functioning. The non-fearful group completed a 15-page questionnaire that did not contain questions specific to height-fear, such as the onset of fear, help-seeking behaviours, or impact on functioning. The non-fearful group did, however, complete measures of height fear severity and trait anxiety in order for between-group comparisons to be made.

TIME 1

Origins Questionnaire-Second Edition (OQ-II) – *Height fear group*

The OQ-II (Menzies & Parker, 2001) is a revised version of Menzies and Clarke's (1993b) original Origins Questionnaire, which was characterised by its capacity to identify both associative and non-associative experiences related to a feared stimulus. Each section of the OQ-II gives participants the opportunity to describe a different event that may have contributed to the onset of their fear. Specifically, participants are asked to describe any direct, vicarious, or informational events that they may have experienced prior to the development of their fear. Each of these events is explored in detail in terms of how much fear and pain was experienced, and whether they became excessively fearful of heights ever since the event. As an expansion of the original OQ, the OQ-II also asks about neo-conditioning processes that might have affected participant's fear acquisition. These factors include the level of fear

towards heights prior to the events, whether similar non-noxious events had occurred before, and whether the perceived dangerousness of an event was subsequently revaluated. Thus, in addition to traditional classical conditioning accounts, the sets of questions included in the OQ-II have the potential to encapsulate many of the theories involved in fear acquisition such as latent inhibition, UCS inflation, and the role of non-specific stress in the dishabituation of fears. These questions also allow researchers to identify any non-associative traumatic experiences. Finally, the OQ-II gives participants the option of describing themselves as having always been fearful of heights.

Several features of the OQ-II were modified for use in the present study. Firstly, the three sources of vicarious conditioning and informational transmission included in the OQ-II were combined into one category. Specifically, whereas the OQ-II asked separately about the participant's vicarious and informational experiences involving their mother, father, and others, the current study simply asked about these experiences involving anyone. Combining the different sources into one category reduced the length of the questionnaire by about ten pages. This may have limited the opportunity for participants to fully describe their experiences if more than one vicarious or informational event had occurred. However, distinguishing between events that are related to different people was of little theoretical significance to this study. Thus, combining them into one category reduced the redundancy of the questionnaire items. Likewise, in their study on the origins of height fear using the OQ-II, Menzies and Parker (2001) reported no statistical analyses comparing the effect that different sources of vicarious and informational experiences had on subsequent fear onset.

The generic term 'the feared object or stimulus' used in the OQ-II was replaced with 'heights' so that the content of the questionnaire referred specifically to the fear of

heights. Modifications in formatting and numbering of the questions were also made. These changes were made to improve ease of understanding, reduce redundancy, and improve return rates. The edited version of the OQ-II used in the present study for the height fear group is included in Appendix E.

At Time 2 and Time 3, participants from both the fearful and non-fearful groups were asked to complete an additional page at the start of the OQ-II that asked whether they had had an accident involving heights during the retest intervals (see page 1 of Appendices D and E). This served to identify any intervening events that could account for inconsistencies in retrospective recall over time. Writing space was provided to describe any height-related incidents that participants found distressing and which had subsequently influenced their attitude towards heights, such as worrying or avoiding heights more or less. Participants were then asked to rate how much their fear towards heights had improved or worsened since they last completed the questionnaire on a seven-point scale, using the anchors A (*much worse*), B (*moderately worse*), C (*mildly worse*), D (*the same*), E (*mildly better*), F (*moderately better*), and G (*much better*).

Scoring

Participants were classified into a pathway of fear onset based on their responses to the OQ-II (see Appendix H for a summary of the scoring criteria as provided by Prof. Ross Menzies). The present study included nine pathway classifications: classical conditioning, vicarious conditioning, informational conditioning, multiple associative pathways, non-associative traumatic event pathway, always been this way, mixed pathways, cannot remember, and cannot classify. These are largely consistent with previous studies that have used the OQ or OQ-II (Menzies & Parker, 2001; Taylor et al., 1999), except for slight differences in the use of the 'mixed pathway' classification. Specifically, a direct *classical conditioning* pathway classification was considered if

the participant described an event where there was a clear UCS-CS association, such as falling from a high place or being injured in the presence of heights. The *vicarious conditioning* pathway was applicable when participants reported seeing another person react fearfully towards heights, either witnessed personally, or seeing fearful reactions through the media such as movies or images of frightened emotions in the newspaper. The *informational conditioning* pathway was relevant if aversive information or warnings about heights were received either personally or from a media source. To fully meet the criteria for any of the above pathways, participants must have also described that they were not fearful before the event, as well as either that they had been excessively fearful ever since the event or had not been able to confront heights with complete ease since the event.

In terms of non-associative pathways to fear, a *non-associative traumatic event* pathway was relevant for scenarios where significant fear or anxiety was experienced when a UCS could not be identified, such as when standing next to a window in a tall building without any other external stressors or fear-provoking stimuli. Participants were also able to describe themselves as having *always been fearful* if they could not remember a time when they were not fearful of heights. Those who remembered a period of time when they were not fearful, but did not meet the criteria for any of the other pathways, were classified into the *cannot remember* category. However, if the details provided for the events were contradictory, inconsistent, or unable to be logically understood, the case was placed in the *cannot classify* category.

Taylor et al. (1999) also included an additional *mixed pathway* category to include cases where the participant described multiple events that clearly contributed to the onset of their fear. This category also encapsulates onset events that involved more than one type of conditioning being experienced simultaneously, such as a having a combination of classical and vicarious conditioning where the participant was being

frightened while seeing another person being frightened at the same time. The present study extended this category and established two separate pathway categories; namely, the *multiple associative pathway* and the *mixed pathway*, in order to distinguish a mix of associative pathways from a mix of an associative and a non-associative pathway. The latter *mixed pathway* category represents scenarios where a panic-like non-conditioning traumatic event was also coupled with experiences of vicarious or informational conditioning. These scenarios should not be attributed to be either associative or non-associative in nature, and thus should not be included when comparing the likelihood of associative and non-associative pathway ascriptions. By making this distinction, cases that involve a mix of associative pathways only (i.e., the *multiple associative pathway* category) can be considered to have developed their fear through associative pathways.

Psychometric properties

In a previous study of height fear, the interrater agreement in classifying participants into particular pathways of fear onset using the OQ-II was high (94.7% agreement; Menzies & Parker, 2001). An Origins Interview conducted by the same authors also demonstrated a high convergence with the OQ-II classifications. The current study performed a similar interrater assessment. The researcher and study supervisor independently reviewed all of the 54 questionnaire responses received from Times 1 and 2, and classified each response into a category of fear onset pathway. Out of the 54 questionnaires classified, there were eight cases (14.81%) of disagreement in classifications, which occurred mostly where subjective evaluations were required to determine whether the criteria for a particular onset pathway had been met. In particular, judgement had to be made in some cases as to whether a described external stressor, such as peer pressure, constituted a UCS that was required for the classical conditioning pathway of fear onset. The cases of disagreements were

resolved after further discussion between the researcher and the study supervisor, and the final classifications were made.

Origins Questionnaire-II Modified (OQ-II-M) – *Height non-fearful group*

Menzies and Parker's (2001) modified version of the OQ-II was used for the non-fearful group (see Appendix F). This was essentially the same questionnaire as the OQ-II used for the fear group, however the wording of instructions that were relevant only to height-fearful participants were replaced with more neutral instructions. For example, while the OQ-II focused on height-related experiences that occurred *before* the onset of height fear, the OQ-II-M asked for *any* height-related experiences without reference to the onset of height fear, as it would clearly not be applicable to non-height-fearful participants.

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Acrophobia Questionnaire (AQ)

The AQ (Cohen, 1977) consists of two scales that assess the severity of anxiety and avoidance associated with situations involving heights (see pages 18-19 of Appendix E). Each scale consists of the same 20 situations, such as 'Riding a Ferris wheel' or 'Driving over a large bridge', and participants are asked to imagine how they would react to these situations in terms of anxiety and avoidance behaviour. Anxiety is rated on a seven-point scale ranging from 0 (*Not at all anxious*) to 6 (*Extremely anxious*). Avoidance is measured by a three-point scale anchored from 0 (*Would not avoid doing it*), 1 (*Would try to avoid doing it*), to 2 (*Would not do it under any circumstances*).

Scoring

The AQ takes five minutes to complete, and is scored by separately summing the ratings for each of the two scales. The total score ranges from 0 to 120 for the

anxiety scale, and 0 to 40 for the avoidance scale. A higher score on either of the scales indicates higher severity of height-related anxiety or avoidance.

Psychometric properties

The normative study by Cohen (1972, cited in Antony, 2001) included a clinical sample of height-fearful adults, who scored an average of 61.30 (*SD* = 15.85) and 14.37 (*SD* = 5.70) for height anxiety and avoidance, respectively. The anxiety and avoidance scales of the AQ are highly correlated (*r* = .73), which suggests that the two scales consistently measure the same construct. Split-half reliabilities of *r* = .82 for the anxiety scale and *r* = .70 for the avoidance scale indicate adequate internal consistency of both scales. Scores are moderately stable for untreated waiting-list participants, with test-retest reliabilities of *r* = .86 and *r* = .82 for anxiety and avoidance, respectively, over a three-month period (Baker, Cohen, & Saunders, 1973). Comparisons between the AQ and behavioural measures of height phobia reveal moderate correlations, which supports its convergent validity (Cohen, 1977). In the present study, Cronbach's alpha for the AQ was very high for both the anxiety (α = .96) and avoidance (α = .92) scales, indicating high levels of internal consistency. Test-retest reliability over three months was also high, with Pearson's *r* = .94 and .90 for anxiety and avoidance, respectively.

Trait Scale of the State-Trait Anxiety Inventory (STAI-T Form Y-2)

The STAI-T (Spielberger et al., 1983) is a 20-item self-report measure that assesses trait anxiety (see page 20 of Appendix E). Participants are asked to consider how each item reflects how they generally feel in response to items such as "I feel nervous and restless", "I feel pleasant", and "I am satisfied with my life". Permission to use this measure in the present study was obtained from Prof. Spielberger (Appendix I).

Scoring

The items are rated on a four-point Likert scale using the anchors 1 (*Not at all*), 2 (*Somewhat*), 3 (*Moderately*), and 4 (*Very Much*). The anxiety-absent items in the list are reverse-scored, and the total score is the sum of the ratings for each item. Scores range from 20 to 80, with higher scores indicating higher levels of trait anxiety.

Psychometric properties

The psychometric qualities of the STAI have been well established through its extensive use in clinical and non-clinical research. Normative data for college students include a mean score of 38.30 (*SD* = 9.18) for men and 40.40 (*SD* = 10.15) for women (Spielberger et al., 1983). Scores obtained from a New Zealand sample were generally lower across most age groups, with a mean score of 32.96 (*SD* = 8.18) for men and 38.39 (*SD* = 10.18) for women (Knight, Waal-Manning, & Spears, 1983). The scale's test retest reliability is good over 30 days (*r* = .71 and .75 for men and women, respectively), and adequate over 60 days (*r* = .68 and .65 for men and women, respectively; Spielberger et al., 1983). Clinical participants diagnosed with anxiety disorders score higher on average compared to non-clinical participants (Bieling, Antony, & Swinson, 1998), suggesting adequate convergent and ecological validity. In the present study, the STAI-T had high internal consistency with α = .92. Test-retest reliabilities over 3 and 12 months were high, with Pearson's *r* = .82 and .79, respectively.

Help-seeking Questionnaire – Height Fear Group

The questionnaire for height-fearful participants also included a final page of questions about their help-seeking behaviour (see page 21 of Appendix E). This set of questions was also used by Taylor, Deane, and Podd (2007) to assess helpseeking behaviour and impact on life for people with driving fear. The five questions asked how much their fear of heights interfered with daily functioning,

whether they had talked to anyone about their fear, whether they felt that their fear warranted professional psychological help, their previous experience of receiving professional help, and the likelihood that they will seek professional help in the future.

PROCEDURE & ETHICAL CONSIDERATIONS

This project was reviewed and approved by the Massey University Human Ethics Committee (MUHEC; Southern B, Application 06/50).[1] The letter of ethical approval is provided in Appendix J. Permission to use the STAI-T Form Y was also obtained from the author (see Appendix I).

Permission to approach internal undergraduate psychology and media studies students was obtained from the corresponding Heads of School and paper co-ordinators. Minimum class time of no more than five minutes was used in accordance with the MUHEC Code of Ethical Conduct. During the class visits, the study was briefly explained and survey packs were left for interested students to take away. Extramural students were able to complete the online questionnaire, having read an online version of the Information Sheet. Both internal and extramural participants were informed of their rights as a participant in the study through the Information Sheet (see Appendix A). These included the right to withdraw at any time, to refuse to answer any questions, and to be able to ask the researchers any questions related to the study. In acknowledgement of their rights, participants were asked to sign a consent form and send it back to the researcher along with the completed questionnaire. As part of the commitment to share the research findings to those who provided the knowledge, all participants who completed the screening questionnaire were sent a summary of the Phase 1 results (see Appendix B). All

[1] The ethics application was completed by the project supervisor before the researcher commenced working on this project.

participants involved in the main study were also sent a summary of the present study's procedures and its main findings (see Appendix C).

As the Phase 2 questionnaires were distributed through the mail, participants were required to provide their contact details, thus participation in the study was not anonymous. Participants' confidentiality was protected by assigning each participant a three-digit identification number, which was the only form of identification used on all of the questionnaires. The assigned number corresponded to the number written on the screening questionnaire that the participant had completed. Upon receipt of the completed screening questionnaire, the participant's name and contact details were separated from the questionnaire containing their assigned ID number, and locked separately in a filing cabinet. The link between the ID numbers and the participants' identities were listed in an electronic document with password protection. Similar security measures were taken for the extramural group, where participants' contact information and their test data were stored separately in two electronic documents, each protected with a different password. The researcher had also signed a confidentiality agreement (see Appendix K*).*

All participants involved in the main study were offered book vouchers as reimbursement for the time and effort spent on completing the questionnaires. Upon the receipt of a completed Time 1 questionnaire, participants were sent $20 worth of book vouchers. An additional $15 worth of book vouchers was given for the completion and return of each subsequent questionnaire at Time 2 and Time 3, given the amount of effort and time required in taking part over the course of one year. This study was supported by funding from the Massey University Research Fund (MURF 06/4023) and the School of Psychology.

RESULTS

OVERVIEW

Participants' responses to the questionnaires were entered into the *Statistical Package for the Social Sciences version 14.0.0*, a statistical computer software package for various descriptive and inferential analyses. Each response was coded as a numerical value for subsequent statistical analyses. Categorical variables such as *Yes/No* or *Present/Absent* responses on the OQ-II and the help-seeking questionnaire were entered as a Boolean variable, while the subjective ratings such as the level of fear or pain experienced during an encounter were entered as the actual value rated on the 10-point scales. Each category of onset pathway was also assigned a numerical value to be coded for each participant in the fearful group.

SCREENING AND MISSING DATA

All participants' responses on the AQ and STAI-T were screened for normality and missing data. For the fear group, there were normal distributions of scores for the two AQ scales and the STAI-T across all three assessment points, as indicated by the Kolmogorov-Smirnov statistic. The non-fearful group's scores on the AQ scales were not normally distributed at any of the three times of assessment. This would largely be attributable to the positive skewness of scores as the non-fearful group scored, as expected, very low on the AQ. Violations of normality are considered quite common in samples larger than 30, and should not cause any major problems in statistical analyses of between-group differences (Pallant, 2007). Some of the respondents' questionnaires had missing data on the AQ scales or the STAI-T. At most, only two items were missing on any one scale. A method for addressing missing data for the STAI-T was used as described by Spielberger et al. (1983) in the

STAI manual. In cases where less than three item responses were missing, the total score was prorated by multiplying the participant's mean weighted score by 20, and rounding the value up to the next highest number. For example, if a participant obtained a total score of 35 for answering 19 of the 20 STAI items, the final prorated score was calculated as {(35/19) x 20} = 36.84, rounded up to 37. No specific method of handling missing data was found for the AQ. For the purpose of consistency, the same formula was used for cases with two or less missing items on the two AQ scales.

Data Analysis

Descriptive analyses were initially conducted to examine the sample's characteristics in terms of height-fear severity, the impact of their height-fear on daily functioning, and their helpseeking behaviour. This also established the current sample group in relation to other samples from previous studies. The present study's hypotheses were then tested separately. The first hypothesis, which predicted that height-fearful participants will more likely ascribe to non-associative pathways to fear, was tested through using the data provided by all 30 fearful and 47 non-fearful participants at Time 1. Because this hypothesis did not involve any predictions in terms of stability or consistency of responses over time, only the data obtained at Time 1 was used for statistical analyses. This avoided repeating statistical tests with the same sample which would increase the chance of finding significant results, or making a Type-I error. A chi-square test for goodness-of-fit was conducted for the fearful group to examine whether there was a significant difference in the proportion of participants ascribing to associative and non-associative pathways. To further examine the influence of associative factors in the development of fear, a series of chi-square analyses were conducted to compare the fearful and non-fearful groups on the proportion of participants who (1) had experienced associative events; (2) reported

having been stressed or depressed during the encounters with heights; and (3) reported a revaluation of the aversiveness of a UCS. Since all of these analyses involved a 2-by-2 comparison, the chi-square tests were computed with Yate's Correction for Continuity as it compensates for the overestimate of the chi-square value when used with 2-by-2 tables (Pallant, 2007). Independent samples t-tests were conducted to examine differences in fear severity between the fearful and non-fearful groups, as well as between those within the fearful group who ascribed to an associative and non-associative pathway of fear onset. Another t-test examined group differences in the mean level of fear or pain experienced during an encounter with heights.

The second hypothesis was related to the stability of responses given across the three points of assessment. To eliminate the inconsistencies resulting from the withdrawal and return of participants at Times 2 and 3, only the 22 fearful and 33 non-fearful participants who completed all three questionnaires were included in any analyses of stability. Cases where the fearful participants ascribed to a different onset pathway at either Time 2 or Time 3 were identified and described. One-way repeated measures ANOVA were conducted for the AQ and STAI-T scores to ascertain the stability of fear severity and trait anxiety. To examine the third hypothesis relating to the influence of intervening height-related events on pathway ascriptions and fear severity, various comparisons were made between those who did and did not report such events, and the appropriate statistical tests were conducted if suitable.

SELECTION OF STATISTICS

Due to the low sample size, the lack of statistical power and the accompanied risk of Type-II error were of particular concern to this study. This was especially true as

previous studies have demonstrated that the sizes of the effects involved in the present study's hypotheses are generally small to medium (Menzies & Parker, 2001; Taylor et al., 1999), which require larger sample groups in order to achieve sufficient statistical power to reliably detect the effects. A consequence of this was that any of the statistically non-significant findings accompanied by a small effect size may have been obtained due to the study's inability to detect the effect, therefore ultimately accepting the null-hypothesis when it is not true (i.e., committing a Type-II error). A common way of compensating for low statistical power is to adopt a more lenient alpha level of 0.10 rather than the standard 0.05, which effectively reduces the risk of Type-II error through increasing risk of Type-I error. However, the present study adopted the alpha level of 0.05 in order to be consistent with previous studies to which the results are compared.

In light of this, the findings of this study were interpreted and discussed with consideration of the effect size of the findings as well as the significance (*p*) level. The *p* value represents the risk of Type-I error in the analysis, and is inversely proportional to the risk of Type-II error. Thus, higher *p* values would provide a preliminary indication of a lower risk of Type-II error. The *p* value is, however, sensitive to the size and characteristics of the sample group (Gravetter & Wallnau, 2004), and has been shown to be highly variable across systematic replications of a test (Cumming, 2008). In studies with insufficient sample sizes such as the current study, the coefficients of effect size may provide a more reliable indication of the magnitude of the findings (Cohen, 1988). The appropriate coefficients for effect size vary according to the statistical analysis involved, which include the phi coefficient (ϕ) for chi-square analyses, Cohen's *d* for *t*-tests, and partial eta squared for ANOVAs. Appendix L provides the formulas for calculating these indicators of effect size as used in the present study, as well as the interpretation of these values as outlined by Cohen (1988).

DESCRIPTIVE STATISTICS

Participants completed the Acrophobia Questionnaire (AQ; Cohen, 1977) as a measure of the severity of their current fear of heights. The mean scores for avoidance (13.23) and anxiety (56.60) on the AQ for the height-fearful group (as previously presented in Table 1 on page 28) were higher than those obtained by previous research with students with height-fear (e.g., Menzies & Clarke, 1993b; Menzies & Parker, 2001). However, the scores were comparatively lower than those obtained through research with clinical acrophobic samples (e.g., Cohen, 1972, cited in Antony, 2001; Menzies and Clarke, 1995a). Thus, while the present study's height-fearful sample has a higher level of fear severity compared to other student samples, it does not appear to be as distressing or disabling as that experienced by clinical samples.

Height-fearful participants were also asked to rate how much their fear interfered with daily functioning on an 11-point scale (from 0 'Not at all' to 10 'Extremely'). The reported mean score was 2.53 (*SD* = 2.46, *n* = 30). Table 3 provides information regarding which people the sample had spoken to about their height-related fears.

TABLE 3
Percentage of Participants in the Fear Group (N = 30) who had Spoken with Different People Regarding Their Height Fear

Person Spoken With	*n*	%
Family members	18	60.00
Friends	14	46.67
Partner or spouse	13	43.33
Other persons	2	6.67
Mental health professional	1	3.33
Medical professional	0	0

Only one participant had received prior psychological help from a mental health professional for any personal or emotional problems. Also, as indicated in Table 4, the majority of the height-fearful group perceived very little need to seek help, and reported that they were very unlikely to seek help for their height fear.

TABLE 4
Degree to which Participants in the Fear Group (N = 30) Felt They Needed or Were Likely to Seek Professional Psychological Help for their Height Fear

Helpseeking Behaviour		*n*	%	Mean (*SD*)
Perceived Need for Help (scale 0-7)				0.90 (1.37)
No need	0	17	56.7	
	1	5	16.7	
	2	3	10.0	
	3	3	10.0	
	4	1	3.3	
	5	1	3.3	
	6	0	0.0	
Extreme need	7	0	0.0	
Perceived Likelihood to Seek Help (scale 0-9)				0.73 (1.51)
Extremely unlikely	0	21	70.0	
	1	4	13.3	
	2	2	6.7	
	3	1	3.3	
Moderately	4	1	3.3	
	5	1	3.3	
	6	0	0.0	
	7	0	0.0	
	8	0	0.0	
Extremely likely	9	0	0.0	

HYPOTHESIS 1: ASSOCIATIVE VERSUS NON-ASSOCIATIVE PATHWAYS

CLASSIFICATION OF PATHWAYS

Based on the criteria established by Menzies and Clarke (1993b), the pathway of fear onset was determined by the most etiologically significant event that a participant had reported on the OQ-II. For example, the ascription to the associative pathways, as

well as the *non-conditioning traumatic event* pathway, requires the participant to not have been fearful before the event, and to be fearful of, or not able to confront heights ever since the event. As participants were asked to freely describe their height-related experiences, the level of detail and structure of the responses was highly variable. Thus, some examples of responses given by participants are provided below to demonstrate the different pathway classifications.

Classical conditioning pathway (category 1)

This pathway involved a clearly identifiable external stimulus that elicited fear in the presence of heights. This included the experience of some punishing or unpleasant events while in a high place. Any incidences involving falls from high places were included in this category, as falling is a consequence of being exposed to heights. Examples of responses that illustrate this pathway of fear onset included:

> "We were on a trip and my mum fell asleep at the wheel. The car almost went off a cliff and we crashed into a tree. I remember getting out of the car and looking down the cliff. I will never forget it."
>
> "Fell from the top floor of an adventure playground at school."

Vicarious conditioning pathway (category 2)

This pathway applied to respondents who developed height fear after seeing someone else being frightened or hurt because of heights. Such an event may have been witnessed personally or through watching media events, such as:

> "I was about 7 or 8 years old. My father was up a very high ladder, lent up against our house. I remember running past him, playing, suddenly the ladder fell and my father fell about 25 metres or more to the ground."
>
> "Watching people doing stunts on TV. Also when people were jumping off the building at 9/11."

Information / Instruction conditioning pathway (category 3)

This pathway applied to respondents who developed height fear after receiving information that affected their attitude towards heights. Such information may have been transmitted personally or through the media, such as:

> "Just the usual warnings from parents about standing too close to edge of cliffs. Brother told me stories of people dying while skydiving etc."

> "My Grandmother told me horror stories about bridges giving way and doors opening onto no-where."

Multiple associative pathway (category 4)

This classification was warranted when the etiologically significant incident involved two or more of the associative categories occurring or being experienced. For example, one participant reported an onset that involved components of both vicarious and informational conditioning:

> "My brother and I were climbing the tree at the backyard, he was hanging by his legs, then he fell off when he tried to get back onto the branch. He told me later that he was so scared being stuck up there."

Another participant had reported the same event on the classical and vicarious conditioning sections of the OQ-II, describing classical and vicarious components involved in the event in the respective sections:

> "I was at the top of the 'fireman's pole' at the playground. Other kids were shouting and laughing, telling me to jump down etc. I got nervous and couldn't do it."

> and

> "Another kid in front of me in line was really scared too. He had to walk back down as well".

This pathway was also relevant for participants who reported two etiologically significant events that occurred at around the same time. In these situations, it was

unclear which of these events had occurred first. For example, a participant reported the following events, both occurring at the age of 8:

> "My brother used to pretend to push me down the edge when we go tramping. I almost fell down the cliff once because of him."

> "My mother was scared of heights and I saw her crying and shaking once when she tried to climb a ladder to the roof"

Both of these events were considered to have influenced the development of fear, and the multiple associative pathway was classified.

Non-conditioning traumatic event pathway (category 5)

Non-associative experiences are those where the only identifiable stimulus that elicited fear responses was the presence of heights itself. In other words, no other independent stimulus appeared to have contributed to elicit the fearful or anxious response. Respondents would have sudden feelings of anxiety that may resemble the symptoms of a panic attack, such as palpitations, dizziness, sweating, and choking sensations. Examples of such an event included:

> "Standing on the edge of a cliff at Cape Kidnappers and realising how easy it would be to fall or be pushed."

> "I was on the 'giant drop' at Dream World in Australia, I was up ridiculously high and knew I was about to drop, but not certain exactly when. I was very frightened and distressed."

Always been fearful pathway (category 6)

Participants in this pathway reported that they did not remember a time when they were *not* fearful of heights, or remember an initial fearful encounter that led them to subsequently develop height fear.

Mixed pathways (category 7)

This classification was warranted when the onset incident involved both an associative and non-associative component occurring or being experienced simultaneously. For example, a participant reported an initial fearful incident where she felt anxious at the edge of a tall building (non-associative traumatic pathway) and seeing another person expressing fearful responses at the same time (vicarious pathway). Because this pathway involves both associative and non-associative components (as opposed to *multiple associative pathways* which only involve associative components), cases that are classified under this pathway are excluded from the chi-square analysis that examines the difference in proportion of participants ascribing to associative and non-associative pathways.

Cannot remember (category 8)

This was relevant for respondents who remembered a time before they were fearful, but could not recall any single event that had sufficient etiological significance to lead to the development of fear. This occurred when the respondent either did not report any past height-related experiences, or when none of the past experiences met the criteria to be etiologically significant.

Cannot classify (category 9)

There was only one response that could not be classified due to contradictory reports and lack of information. In this case, the respondent reported three separate height-related events. She reported being fearful of heights ever since each of these events but not fearful prior to the events. Thus, while each of the events met the criteria for the corresponding pathway classification, the contradiction in reports made it unclear whether the events had any etiological significance to her height fear, and no clear pathway was able to be ascertained.

Table 5 shows the frequency of pathway classifications for the height fear group across the three time points. It is important to note that this data represents the total frequency of each pathway being described at each time of testing, and does not reflect the consistency of pathway ascriptions over time. For example, even though there were two ascriptions to the vicarious conditioning pathway at all three times of testing, it does not indicate that these ascriptions were made by the same two participants. The list of pathway ascriptions made by each participant over the three time points is provided in Appendix M to illustrate the exact type of changes that were observed in this study.

TABLE 5
Frequency of Pathway Classifications For The Fear Group at Initial Assessment (Time 1), Three Months Later (Time 2), and 12 Months Later (Time 3)

Pathway	Time		
	Time 1 *n* = 30	Time 2 *n* = 24	Time 3 *n* = 26
Associative pathways			
Classical conditioning	4	3	1
Vicarious conditioning	2	2	2
Informational conditioning	1	0	0
Multiple associative pathways	1	2	3
TOTAL ASSOCIATIVE	8	7	6
Non-associative pathways			
Non-associative traumatic event	6	5	5
Always been fearful	11	9	13
TOTAL NON-ASSOCIATIVE	17	14	18
Other			
Mixed pathway	2	0	0
Cannot remember	2	3	2
Cannot classify	1	0	0
TOTAL OTHER	5	3	2

As Table 5 shows, at Time 1, 8 (26.67%) respondents ascribed to one of the associative pathways compared to 17 (56.67%) to non-associative pathways.

Despite having twice as many participants ascribing to a non-associative pathway as those to an associative pathway, a chi-square test for goodness of fit showed that this difference in proportions was not statistically significant, $\chi^2(1) = 3.24$, $p = 0.07$, $\phi = 0.33$.

Participants who ascribed to associative pathways were slightly younger than those ascribing to non-associative pathways ($M_{associative} = 29.5$ years, $M_{non\text{-}associative} = 34.7$ years), but this difference was not statistically significant, $t(23) = 1.02$, $p = .32$, $d = 0.46$). The mean scores provided by these two groups are shown in Table 6. In terms of fear severity, independent-samples t-tests revealed no significant differences in the AQ-Anxiety ($t(23) = 1.04$, $p = 0.31$, $d = 0.46$) and AQ-Avoidance scores ($t(22.94) = 0.59$, $p = 0.57$, $d = 0.26$) between those who ascribed to associative and non-associative pathways. Similarly, there was no difference in STAI-T scores between those ascribing to associative and non-associative pathways, $t(21.67) = 1.29$, $p = 0.21$, $d = 0.59$.

TABLE 6
Fear Severity and Trait Anxiety of Participants Who Ascribed to Associative and Non-Associative Pathways

Measure	Mean score (*SD*)	
	Associative *n* = 8	Non-associative *n* = 17
AQ-Anxiety	52.38 (12.41)	59.94 (18.63)
AQ-Avoidance[a]	12.63 (2.92)	13.76 (6.81)
STAI-T[a]	50.50 (6.23)	45.88 (11.37)[b]

SD = standard deviation. Acrophobia Questionnaire (AQ) Anxiety scale; possible score range from 0-120. Acrophobia Questionnaire (AQ) avoidance scale; possible score range from 0-40. Trait scale of the State-Trait Anxiety Inventory (STAI-T); possible score range from 20-80. [a] The equality of variances assumption was violated as indicated by Levene's Test for Equality of Variance. The adjusted figures calculated by SPSS were used. [b] *n* = 16 due to one case of pairwise exclusion.

To examine the link between the experience of associative learning events and the subsequent onset of height fear, the frequency of associative events experienced by both the fearful and non-fearful participants is shown in Table 7.

TABLE 7
Number of Participants Who Had Experienced Associative Events with Heights

Event type	Number of Participants (%)[a]	
	Fearful *n* = 30	Non-fearful *n = 47*
Classical conditioning[b]	16 (53.33)	30 (63.83)
Vicarious conditioning[c]	8 (26.67)	36 (76.60)
Information conditioning[d]	8 (26.67)	18 (38.30)
Total (any associative event)	18 (60.00)	39 (83.00)

[a] Each participant may report more than one event, and thus the sum of the number of participants who reported direct and indirect experiences may not represent the total *n* of the sample group. [b] Includes events that involve an external UCS, and events where pain was experienced. Does not include non-associative traumatic experiences. [c] Includes events that are witnessed personally or observed through the media. [d] Includes events where information was received either personally or through the media.

It was found that 83% of the non-fearful participants had experienced a height-related associative event that could have led to the conditioning of height fear. This was found to be a significantly higher percentage than the 60% from the fearful group, $\chi^2(1) = 3.91$, $p < 0.05$, $\phi = 0.23$. However, when examining the frequency of each type of conditioning event separately, it was found that there was a significant between-group difference only in the experience of vicarious events, $\chi^2(1) = 11.65$, $p < 0.01$, $\phi = 0.39$.

The difference between the aversiveness of various associative experiences was then examined. Table 8 provides a summary of the participants' report of subjective fear that was experienced during the various types of associative events.

TABLE 8
Mean Level of Fear Experienced During Associative Events

Event Type	Fearful Group			Non-Fearful Group		
	n	Mean[a]	*SD*	*n*	Mean[a]	*SD*
Classical	16	7.88	1.59	30	5.13	2.19
Vicarious	8	5.00	1.77	36	2.47	2.57
Informational	8	4.00	2.73	18	2.39	2.12

a Self reported level of fear rated on a 0 – 10 scale; 0 indicating no fear, and 10 indicating worst fear I can imagine.

Independent-samples t-tests revealed that the classical and vicarious learning events experienced by height-fearful participants were significantly more frightening than those experienced by the non-fearful participants [$t(39.78) = 4.41$, $p < 0.01$, $d = 1.40$; $t(42) = 2.64$, $p < 0.05$, $d = 0.98$, respectively]. Thus, while non-fearful participants also experienced associative events, such events were reported to be less frightening or fear-eliciting than those experienced by fearful participants. However, the between-group difference in the aversiveness of information learning events was not significant, $t(24) = 1.64$, $p = 0.11$, $d = 0.73$. Of note, the assumption of equality of variances was violated for the t-test comparing classical conditioning events, and the appropriate adjusted figures calculated by SPSS were used.

As part of the investigation of the non-associative components of fear development, the potential role of non-specific stressors or depression in triggering the dishabituation of height fear was investigated. Examples of stressors that were described by participants included those involving physical and mental illness, financial hardship, and moving residence and having to adjust to a new environment. There were eight participants in the fearful group who reported stressful life circumstances during the time of the etiologically significant learning event. Only one of these eight cases had ascribed to a non-associative pathway. For the non-fearful group, 14 participants had reported life stressors during potential fear-learning events. A chi-square test of independence found no significant differences between the fearful and non-fearful groups in the proportion of participants whose fear-learning event had occurred during periods of stress, $\chi^2(1) = 0.35$, $p = 0.56$, $\phi = 0.07$. In terms of depression, two of the fearful participants reported being depressed during the learning event, while five non-fearful participants reported being depressed during an associative encounter with heights. A chi-square test was not conducted to examine this group difference because of insufficient *n.*

Finally, examples of UCS revaluation were identified in order to evaluate the relevance of this process to the development of fear. According to this theory, a person need not necessarily be fearful of heights straight after an associative event, as fear can subsequently develop through later revaluations of the event. While previous research by Menzies and Parker (2001) did not find any cases of UCS revaluation, the present study identified eight participants who reported having revaluated the dangerous of heights or a related UCS. However, all of these eight cases were revaluations of an event that was already the most etiologically significant event for the participant. Thus, the reports of revaluation of previous events mainly involved an increase in fear severity rather than the development of persistent height fear. For example, one participant who was classified into the *multiple associative pathway* described the gradual revaluation of the warnings received from her grandmother:

> "Whenever I see people fall or jump off a high place in movies or on TV, I would remember what my grandmother told me. Over the years, I think about it a lot more and I just start avoiding all high places."

Overall, the present study found mixed support for both the associative and non-associative theories in the development of height fear. The finding that a substantial percentage of non-fearful participants had experienced aversive height-related encounters highlights the limitation of associative theories that conditioning-type events are insufficient in conditioning fear. However, consistent with associative explanations of fear acquisition, the associative learning events experienced by height-fearful participants were generally more aversive or frightening than those for the non-fearful group where height fear was not subsequently conditioned.

The question is whether these findings represent the most accurate information that participants were able to give in light of the limitations in human memory. More importantly, would participants' responses change over a short period of time?

Hence, the second and primary hypothesis examined whether retrospective recall was subject to change over time.

HYPOTHESIS 2: STABILITY OF RETROSPECTIVE RECALL

The second hypothesis stated that changes in the ascription to pathways of fear onset would be observed over a 12-month period. This was tested through comparing each participant's responses over the three times of test administration. Comparing responses obtained at Time 1 and Time 2 provided information about the changes that occurred within a three-month period, while comparisons between Time 2 and Time 3 provided information about changes occurring over nine months. The stability of pathway ascriptions between Time 1 and Time 3 (i.e., stability over 12 months) was not examined. This would have been problematic due to the administration of an intervening Time 2 questionnaire. Specifically, the extent of stability of retrospective recall at Time 3 could only be considered for the duration since the questionnaire was last completed, which for the majority of participants was the Time 2 questionnaire nine months prior. Even though there were four participants who only returned the Time 1 and Time 3 questionnaires, this study could not eliminate the possibility that these participants may have completed the questionnaire but simply did not return it. In other words, not completing the Time 2 questionnaire did not necessarily indicate that responses given at Time 3 had a 12-month retest period. Thus, there was little meaning in comparing responses from the Time 1 and Time 3 questionnaires since that would not provide accurate information about retrospective instabilities over 12 months.

For the purpose of consistency and to eliminate the variability due to participants dropping out and returning at Times 2 and 3, only the 22 fearful and 33 non-fearful

participants who returned all three questionnaires were included in assessing this hypothesis. The stability of several aspects of retrospective recall were explored. Primarily, any changes in the ascription to pathways of fear onset were identified.

STABILITY OF PATHWAY ASCRIPTION

Table 9 provides the data for the pathways ascribed to by respondents at Time 1, as well as the percentage who reported the same pathway at Time 2. This illustrates the extent of instability that was observed over a three-month period. Overall, 82% of ascriptions remained the same, while 4 out of 22 (18%) respondents provided inconsistent ascriptions of the pathway to their height fear after three months.

TABLE 9
Stability of Pathway Ascriptions Over Three Months Between Time 1 and Time 2

Pathway	Pathway classification (*n* = 22)				% of original classifications which stayed the same
	Time 1		Time 2		
	n	%[a]	*n*	%[a]	
ASSOCIATIVE					
Classical conditioning	3	13.63	2	9.10	66.7
Vicarious conditioning	2	9.10	1	4.54	50
Informational conditioning	0	0	0	0	N/A
Multiple associative pathway	0	0	0	0	N/A
NON-ASSOCIATIVE					
Non-conditioning traumatic event	5	22.72	5	22.72	100
Always been fearful	10	45.45	9	40.91	90
OTHERS					
Mixed pathway	0	0	-	-	N/A
Cannot remember	1	4.54	1	4.54	100
Cannot classify	1	4.54	0	0	0
Total	22	100	18	81.81	

N/A = not applicable. [a] Calculated as the percentage of the total sample of 22.

Among the four participants who had a change in pathway ascriptions, there was some variability in the responses that led to the change. Some of the changes were

due to minor differences in the recall of specific details of the events, while others were due to the reporting of entirely different events. Specifically, the four cases of pathway change were:

1 from *classical conditioning* to *cannot remember*: the classical conditioning event reported at Time 1 was not reported at Time 2, and the participant did not meet the criteria for any other pathways at Time 2;
2 from *vicarious conditioning* to *multiple associative pathway*: this participant reported an additional classical conditioning component at Time 2 which accompanied the vicarious event reported at Time 1;
3 from *always been fearful* to *cannot remember*: this participant changed from believing that she had always been fearful to being able to remember a time when she was not fearful. However, her responses at Time 2 did not meet the criteria for any pathways to be classified; and
4 from *cannot classify* to *multiple associative pathway*: this participant had reported a very different set of experiences between the two questionnaires. Her responses at Time 1 were contradictory as she reported having two separate events, occurring at different ages, that had *caused* her height fear. At Time 2, she reported etiologically significant classical and informational conditioning events both occurring at around the same age.

Participants' responses to the Time 2 and Time 3 questionnaires were examined in order to assess the stability of pathway ascriptions over a period of nine months. Table 10 provides the pathways ascribed to by participants at Time 2, as well as the percentage who had reported the same pathway at Time 3. Of the 22 respondents, 73% of ascriptions remained the same, while 6 (27.3%) had a change in pathway ascription after nine months. Three of these six participants also had changes in pathway ascriptions between Time 1 and Time 2. Specifically, the first three of the

four cases listed above for having unstable pathway ascriptions between Time 1 and Time 2 also had changes in pathway ascriptions between Time 2 and Time 3.

TABLE 10
Stability of Pathway Ascriptions over Nine Months Between Time 2 & Time 3

Pathway	Pathway classification (*n* = 22)				% of original classifications which stayed the same
	Time 2		Time 3		
	n	%[a]	*n*	%[a]	
ASSOCIATIVE					
Classical conditioning	2	9.09	1	4.55	50.00
Vicarious pathway	1	4.55	1	4.55	100.00
Informational pathway	0	0.00	0	0	N/A
NON-ASSOCIATIVE					
Non-conditioning traumatic event	5	22.73	4	18.18	80.00
Always been fearful	9	40.91	8	36.37	88.89
OTHERS					
Mixed pathway	2	9.09	1	4.55	50.00
Cannot remember	3	13.64	1	4.55	33.33
Cannot classify	0	0.00	0	0	N/A
Total	22	100.0	16	72.73	

N/A = not applicable. [a]Calculated as the percentage of the total sample of 22.

Of the six participants who changed their pathways ascriptions after nine months, the changes were:

1 from *classical conditioning* to *vicarious conditioning,* as completely different events were reported;

2 from *non-conditioning traumatic event* to *cannot remember*, as a previously non-associative incident was omitted at Time 3;

3 from *always been fearful* to *multiple associative pathway*, as the participant reported multiple additional associative events at Time 3;

4 from *multiple associative pathways* to *always been fearful*;

5 and (6) from *cannot remember* to *always been this way,* as a result of the change in belief that they had always been fearful.

Overall, results revealed that an instability of pathway ascriptions was observed in 18.18% of cases over three months, and 27.27% of cases over nine months.

Stability of Height Fear Severity and Trait Anxiety

One factor that could contribute to pathway changes over time is changes in fear severity, so scores on the AQ and STAI-T scales over time were examined. Changes in AQ scores may indicate genuine changes of participants' fear severity at the time of testing. However, since the STAI-T is a measure of trait rather than state anxiety, participants' scores on this measure were not expected to change significantly, especially over the short retest period of three months between Time 1 and Time 2. Three one-way repeated measures ANOVAs were conducted to determine whether there were changes in scores on these three scales over the three time periods. The means and standard deviations of these scores are provided in Table 11. As this analysis involves data from all three questionnaires, only the 22 fearful and 33 non-fearful respondents who completed all three questionnaires were included.

TABLE 11
Mean (SD) Fear Severity and Trait Anxiety Over a 12-Month Period.

	Time 1	Time 2	Time 3
Fear group (*n* = 22)			
AQ-Anxiety (*SD*)	55.68 (15.37)	57.27 (15.66)	58.82 (16.67)
AQ-Avoidance (*SD*)	12.27 (5.25)	13.14 (5.24)	12.68 (5.77)
STAI-T[a] (*SD*)	47.67 (9.74)	46.37 (10.97)	47.67 (10.41)
Non-fearful group (*n* = 33)			
AQ-Anxiety (*SD*)	11.97 (7.05)	11.64 (6.38)	11.24 (7.55)
AQ-Avoidance (*SD*)	1.82 (1.89)	1.79 (1.65)	1.82 (2.05)
STAI-T (*SD*)	38.06 (9.79)	36.15 (9.23)	37.79 (11.98)

SD = standard deviation. Acrophobia Questionnaire (AQ) Anxiety scale; possible score range from 0-120. Acrophobia Questionnaire (AQ) Avoidance scale; possible score range from 0-40. Trait scale of the State-Trait Anxiety Inventory; possible score range from 20-80. [a] *n* = 21 due to one case of pairwise exclusion.

For the fearful group, there were no significant differences between the three time periods on the AQ-Anxiety scale (Wilk's Lambda = .91, $F(2,20) = 1.04$, $p = .37$), AQ-Avoidance scale (Wilks' Lambda = .95, $F(2,20) = .55$, $p = .59$), and STAI-T (Wilks' Lambda = .96, $F(2,19) = .40$, $p = .68$). The effect sizes for these results as indicated by Partial Eta Squared were .09 for AQ-Anxiety, .05 for AQ-Avoidance, and .04 for STAI-T. Following Cohen's (1988) guidelines for the interpretation of effect sizes (i.e., .01 = small, .06 = moderate, .14 = large), these results suggest moderate effect sizes.

For the non-fearful group, no significant differences between the three time periods were found for AQ-Anxiety (Wilks' Lambda = 0.99, $F(2,31) = 0.13$, $p = .88$), AQ-Avoidance (Wilks' Lambda = 1.00, $F(2,31) = 0.01$, $p = .99$), and STAI-T (Wilks' Lambda = 0.85, $F(2,31) = 2.74$, $p = .08$). The effect sizes for these results as indicated by Partial Eta Squared were .01 for AQ-Anxiety, <.01 for AQ-Avoidance, and .15 for STAI-T.

Repeated measures ANOVAs adopt an additional assumption of sphericity, which requires that the variances for each set of different scores are equal (Pallant, 2007). This assumption was violated only for the non-fearful group's scores on the STAI-T scale, as indicated by Mauchly's Test of Sphericity. One of the recommended ways to compensate for this violation is to elevate the alpha level in order to reduce the risk of Type-II error, in which case the ANOVA for the non-fearful group's STAI-T scores reached statistical significance ($p < .10$). Post-hoc paired-samples *t*-tests found significant differences in STAI-T scores given by non-fearful participants between Time 1 and Time 2, $t(32) = 2.37$, $p < .05$, $d = .84$.

To summarise, significant instability in non-fearful participants' trait anxiety scores was observed over three months, which was unexpected because trait anxiety is not expected to vary significantly over a short period of time. However, there were no differences across time for fear severity and trait anxiety for the fear group that might have had a bearing on changes in pathway ascriptions over time. For the fearful group, 18-27% of pathway ascriptions were unstable over time, and the extent of instability appeared to increase with a longer re-test period. The next essential step was to distinguish erroneous instabilities in reports from any genuine changes that might have contributed to the variations in participants' accounts through examining any height-related intervening events that participants reported.

HYPOTHESIS 3: HEIGHT-RELATED INTERVENING EVENTS

It was hypothesized that exposure to heights or height-related situations during the 12 month retest period would alter the respondent's severity of height fear, and may be associated with subsequent changes in pathway ascriptions. The focus was on the events that occurred during the three months between the questionnaires at Time 1 and 2, and the nine months between Time 2 and 3.

Participants were asked whether or not they had a height-related accident or experience during the time since they completed the previous questionnaire. During the three months between the Time 1 and Time 2 questionnaires, five participants from the fear group described an intervening height-related event. These events all resembled a non-associative traumatic exposure to heights, such as:

> "I got a shock a few weeks ago when I went to the opera at St. James theatre with friends. It was difficult to cope with the steep slope in the dress circle though we weren't at the front of the balcony."

Most of the reports disclosed that the intervening event had caused more interference to their daily functioning in terms of having to avoid certain situations more. Some examples of reported intervening events include:

> "We crossed a rope bridge […] two months ago. It caused such anxiety I was left shaking and crying for 10 minutes. I feel far more frightened of heights now!"
>
> "Walking up stairs that you could see through to the ground, made me avoid those type of stairs since."
>
> "My partner fell from a ladder […]. Broke his wrist and suffered significant tendon damage. I am now even less likely to get on a ladder, particularly outdoors."

During the nine months between the Time 2 and Time 3 questionnaires, six respondents from the fearful group reported height-related intervening events. In addition to non-associative traumatic encounters, there were also two cases of vicarious conditioning where the respondent personally witnessed another person being anxious or hurt because of heights. Three respondents reported that their fear had worsened because of the intervening event. However, there was one respondent who had a non-fearful encounter with heights, and had subsequently disclosed a mild improvement in height fear severity.

Overall, none of the five participants who reported an intervening event between Times 1 and 2 had a change in pathway ascription at Time 2. Similarly, none of the six participants who reported an intervening event between Times 2 and 3 had a change in pathway ascription at Time 3. Thus, the present study did not find any association between intervening events and the instability of pathway ascriptions. Chi-square analyses for independence that would formally test the relationship between having an intervening experience and ascribing to a change in pathway were not conducted due to obvious lack of *n* counts in some cells.

In terms of fear severity, participants were asked to complete an item asking whether their fear of heights had improved or worsened on a 7-point scale (from A 'Much worse' to G 'Much better'). Between Time 1 and Time 2, two participants rated that their height fear had become *mildly better,* one rated *mildly worse,* and one rated *moderately worse.* As indicated in Table 12, reports of feeling better or worse did not always converge with the changes in AQ-Anxiety and AQ-Avoidance scores for these participants. For example, the two participants who reported feeling *mildly better* at Time 2 obtained higher AQ-Avoidance scores at Time 2. Similarly, the two participants whose height-fear had *mildly worsened* at Time 2 scored lower on the AQ-Anxiety scale at retest. However, due to the low number of cases in this observation, it was not appropriate to use any statistical analysis to test the significance of these differences.

TABLE 12
Changes in Total AQ and STAI-T Scores for Individual Participants Who Reported Change in Fear Severity Between Time 1 and Time 2.

Self-reported change in fear severity	AQ-Anxiety (range: 0-120)		AQ-Avoidance (range: 0-40)		STAI-T (range: 20-80)	
	Time 1	Time 2	Time 1	Time 2	Time 1	Time 2
'*Mildly Better'*						
Participant A	52	42	8	11	49	38
Participant B	61	59	16	17	58	53
'Mildly Worse'						
Participant C	91	86	20	17	49	50
'Moderately Worse'						
Participant D	73	69	16	17	59	52

Between Time 2 and Time 3, three participants reported that their height-fear had become *mildly better* over nine months, while three participants reported feeling *mildly worse.* As Table 13 indicates, convergence between such reports and changes in AQ scores was observed in approximately half of the cases.

TABLE 13
Changes in Total AQ and STAI-T Scores for Individual Participants Who Reported Change in Fear Severity Between Time 2 and Time 3.

Self-reported change in fear severity	AQ-Anxiety (range: 0-120)		AQ-Avoidance (range: 0-40)		STAI-T (range: 20-80)	
	Time 2	Time 3	Time 2	Time 3	Time 2	Time 3
'Mildly Better'						
Participant A	69	63	12	10	43	41
Participant B	49	53	11	10	34	37
Participant C	60	49	11	7	54	50
'Mildly Worse'						
Participant D	52	62	18	21	64	68
Participant E	64	61	12	13	47	38
Participant F	69	65	17	13	52	57

SUMMARY OF RESULTS

The present study found that height-fearful participants were twice as likely to endorse non-associative pathways to fear compared to associative pathways. However, this difference in proportion was not statistically significant. In addition, this result was obtained within a context where 18.18% to 27.27% of pathway ascriptions were unstable over three months and nine months respectively. As height-related intervening events that occurred between tests did not coincide with changes in pathway ascriptions, there is a need to identify aspects of the study's methodological characteristics that could affect both the pathway ascriptions and their stability. Several issues surrounding the study's research procedures, sample size, and its use of the OQ-II and its classification criteria, have implications on how the findings should be interpreted, and warrants further discussion.

DISCUSSION

The present study provided some additional evidence regarding the relevance of non-associative theories to the development of height-fear, as well as the stability of retrospective recall of fear onset over time. To date, there is only one published research article that has used the OQ-II to assess fear onset pathways (e.g., Menzies & Parker, 2001). The authors have noted that, while the OQ-II has sound interrater reliability and convergent validity, the data obtained by this instrument is still subject to the constraints of human memory (Menzies & Parker, 2001). The present study provides additional information about the psychometric properties of the OQ-II with a student sample, and has identified potential shortcomings that may be worthy of future review. In addition, and as the primary purpose of the research, this study is the first piece of research that has examined the stability of ascriptions to fear-onset pathways using a consistent method of retesting by having identical instruments at each test administration. Unlike previous research that used different instruments between tests (e.g., Taylor et al., 1999), this represented a major strength of this study, as it was able to rule out the contribution of methodological differences to the instability of people's reports. Despite these strengths in the study's design, there were also various shortcomings that likely affected the accuracy of hypothesis testing and the substance of the conclusions. This section reviews the study's findings and shortcomings in terms of their implications regarding each of the hypotheses. It concludes with a summary of the findings, limitations, and recommendations for future research.

HYPOTHESIS 1: ASSOCIATIVE VERSUS NON-ASSOCIATIVE PATHWAYS

The study's first hypothesis was that height-fearful participants would more likely ascribe to a non-associative pathway to the onset of fear than to an associative pathway. Although the result was in the predicted direction, the proportion of respondents who ascribed to non-associative pathways (57%) was not significantly greater than those who ascribed to associative pathways (27%). This finding is consistent with previous research by Menzies and Parker (2001), which also found a higher but non-significant proportion of height-fearful participants ascribing to non-associative pathways (54% vs. 36%, respectively). Thus, the study's first hypothesis was not supported.

IMPLICATIONS FOR ASSOCIATIVE THEORIES

The present study has identified scenarios where each of Rachman's three pathways to fear (i.e., classical, vicarious, and informational conditioning) were by themselves sufficient in conditioning height fear for a participant. The classical conditioning pathway was the most commonly endorsed associative pathway, and five of the six classifications of *multiple associative pathways* across the three times of testing also involved a classical conditioning component. The vicarious conditioning pathway was also influential for a small percentage of participants. Different scenarios of observational learning were identified, including the modelling of fear (e.g., seeing others expressing fear while they were exposed to heights), and learning about the dangerousness of heights through witnessing the consequence of being exposed to height (e.g., seeing a person fall). Conversely, the influence of informational conditioning appeared to be less substantial, as it was etiologically significant in only two cases (one of which was part of the *multiple associative pathway*).

In addition, this study also identified several processes that are consistent with the associative framework. Firstly, despite many of the non-fearful participants reporting having experienced associative learning events, it was found that these events were generally less aversive or frightening than those experienced by fearful participants. This is consistent with associative theories which posit a positive relationship between the aversiveness of a stimulus or punishment and the severity of the conditioned response (Rachman, 1977, 1991). This follows closely the concept of UCS revaluation, where changes to the aversiveness of the stimulus are expected to cause changes in the person's response to the stimulus (Davey, 1989; Rescorla, 1968). However, a possible confounding factor to this finding is that the fearful group has higher trait anxiety levels than the control group, as indicated by STAI-T scores. As a result, fearful participants may report more aversive events or perceive them as being more frightening than those with lower trait anxiety. Indeed, in a previous study by Menzies and Parker (2001) where there were no significant differences in trait anxiety between the fearful and control groups, the mean level of fear experienced during associative events was actually higher in the control group than the fearful group. In terms of the potential role of UCS revaluation in the development of fear, Menzies and Parker (2001) found no descriptions of any revaluation processes that changed the participants' perception of heights since their initial fearful encounter. The authors concluded that, while the process of UCS revaluation is theoretically possible, these processes may be of little relevance to the actual acquisition of fear in humans. However, in the present study, it was quite common for participants to describe how they perceived heights as being more dangerous since the encounter with heights. One participant provided an example of the effect of UCS revaluation occurring over time:

> "My experiences of heights since that initial experience have only reinforced my fear. I realise that there is a genuine risk to being off the ground and that my initial fears were correct!"

In another example, a participant described an incident of falling from a tree when she was a small child. She did not become fearful of heights after this incident, but reported that she now thinks she should have been more careful at that time due to her present belief that heights are dangerous.

It is acknowledged that such accounts do not represent the UCS revaluation processes as described by Rescorla (1968), where the same UCS associated with heights during an initial encounter is intensified to produce greater anxiety responses. However, having an elevated level of perceived danger is indicative of heights being revaluated through particular experiences, which do not necessarily need to be conceptualised in terms of cue (CS) – consequence (UCS) associations (Davey, 2002). It is unclear what Menzies and Parker (2001) adopted as their criteria for understanding UCS revaluation. However, their finding that "no subject indicated that their perception of the threat associated with any learning event had changed since the event" (p. 196) was not replicated in the present study. Thus, associative processes do appear to have a role in the development of height fear.

Implications for Non-Associative Theories

The proportion of height-fearful participants ascribing to non-associative pathways was not significantly greater than that to associative pathways, although the *p* value of 0.07 almost reached significance. Indeed, having one additional participant ascribing to a non-associative pathway would be sufficient to achieve a significant finding at the 0.05 alpha level. Since *p* is sensitive to sample size, using the *p* value as an indicator of the significance of this finding may be problematic due to the high risk of Type-II error that accompanies a low sample size. Thus, it is also important to look at the effect size or the magnitude of the difference in proportions as provided by the phi-coefficient, which is independent of sample size. In this case, the phi-coefficient was 0.33, indicating a medium to large effect size. This is comparable to

the ϕ = 0.38 obtained by Menzies and Clarke (1995a), who found that their sample of 129 clinically height-phobic participants had ascribed to non-associative pathways significantly more often than to associative pathways. Following Cohen's convention, having 0.80 statistical power to detect a medium effect through a chi-square analysis of goodness of fit would require a sample size of around 80 participants – a criterion that Menzies and Clarke (1995a) had met. This alludes to the possibility that the current study may have observed a statistically significant result if there was a larger sample group. Clearly, with only 25 participants involved in this analysis, the risk of Type-II error is substantial. A replication of this study using a larger sample group would provide some clarification as to whether the null hypothesis is in fact true, or if it was due insufficient statistical power as a result of low sample size.

Comparing the present results with those of previous studies, the severity of height fear could relate to the frequency of non-associative pathways being ascribed. As shown in Table 14, greater percentages of non-associative ascriptions have been found in samples with higher fear severity.

TABLE 14
Comparison of Sample Characteristics and Research Findings with Previous Research on Height Fear

	Menzies & Clark (1993b)	Menzies & Parker (2001)	Present study	Menzies & Clark (1995a)
Fear group sample size	50	54	30	129
Population	Students	Students	Students	Clinical
Classification measure	OQ	OQ-II	OQ-II	OQ
Mean AQ-Anxiety*	**43.44**	**48.11**	**56.60**	**64.63**
Mean AQ-Avoidance*	**11.58**	**12.61**	**13.23**	**15.00**
% Associative	46.0	37.0	26.7	35.7
% Non-associative	42.0	55.6	56.7	64.3
% Other	12.0	7.4	16.6	N/A
Effect size (phi ϕ)	**0.06**	**0.2**	**0.33**	**0.38****

* Standard deviations were not reported in previous research.
** Reached significance at $p < .01$.

This trend presents a contrast to a common criticism made about non-associative theories, namely that innate or dishabituated fears are mild to moderate in nature, and cannot account for the more severe and disabling phobias that develop through conditioning (Davey, 2002; Mineka & Öhman, 2002). Thus, this emerging trend may indicate the need for more research into how non-associative processes may account for the development of more severe types of phobia-like fears. Currently, there is little empirical support for this trend, as consistent research data is scarce. As previously reported, no significant differences in AQ scores were found between those ascribing to associative and non-associative pathways in the current and previous studies.

It is also important to acknowledge that having a non-significant difference in the proportions of pathway ascriptions implies that neither associative or non-associative pathways are predominant. Thus, this research has found non-associative pathways to have just as much influence on the development of fear as associative theories. Indeed, the present study's findings are supportive of the non-associative framework. First and foremost, the ascription to non-associative pathways was double that to associative pathways – a trend that persisted across a 12-month period. In addition to the *always been fearful* pathway being the most frequently endorsed pathway, this study also found many incidences where non-associative traumatic events were the key to participants' fear onset. This highlights that, even when people's fear towards heights was developed through aversive encounters, the presence of heights itself is sufficient to produce fearful responses, while components of classical conditioning, such as an external threatening stimulus or a consequence to being exposed to heights, are not required. These results are supportive of Poulton and Menzies' (2002) view of heights as an evolutionary-relevant fear-eliciting stimulus, whereby conditioning experiences are not required to elicit fear responses towards heights because it has historically been dangerous to humans as a species.

Another non-associative component in fear onset is the dishabituation of fear due to non-specific stress. However, the present study did not identify any cases where stress or depression had led to the re-emergence of the participant's fear. As previously reported, seven out of the eight fearful participants who reported stressful life circumstances during the time of the etiologically significant event had ascribed to an associative onset pathway. Thus, the development of fear would mostly be attributable to and more convincingly explained by the conditioning that had occurred.

Comparisons of this study's findings to research on evolutionary-neutral fears reveal some similarities. For example, while 42% of height-fearful participants ascribe their fear to a non-associative onset pathway (Menzies & Clarke, 1993b), a very similar percentage (40%) of people with driving-related fears also described non-associative onset pathways (Taylor & Deane, 1999). This is potentially problematic for the non-associative framework to explain, as it appears that the evolutionary-relevance of a feared stimulus does not fully account for the fear to be acquired through non-associative pathways. It is possible that people with higher overall trait anxiety are more prone to develop fears without conditioning experiences. However, both Taylor and Deane (1999) and the current study found no significant differences in STAI-T scores between those who ascribed to associative and non-associative pathways, and with a relatively large effect size (d = 0.59 in this study), the chance of this being due to Type-II error is low. One possible explanation, as rigorously pointed out by researchers oriented towards associative explanations, is that the *non-conditioning traumatic event* and *always been fearful* non-associative pathways also encapsulate participants who have simply forgotten about an associative encounter. Participants who do not remember a time before they became fearful of heights would, by definition, be considered as having *always been fearful.* These limitations inherent to human memory would impact on the accuracy of retrospective recall, and would

possibly increase the endorsement of non-associative pathways to the development of height fear.

HYPOTHESIS 2: STABILITY OF RETROSPECTIVE RECALL

This study identified various aspects of retrospective recall that are subject to change over time. Specifically, 18.18% (*n* = 4) of pathway ascriptions made were unstable over three months, and 27.27% (*n* = 6) were unstable over nine months. This is comparatively less than the 45.88% (*n* = 39) instability identified by Taylor et al. (1999) over 12 months for driving fear. As hypothesised, by adopting a more consistent method of retesting compared to Taylor et al.'s study, the level of instability observed was vastly reduced. These findings are consistent with the study's second hypothesis.

When examining the proportions of pathway changes that occurred throughout the study, it was seen that the '*cannot remember'* classification accounted for half of the unstable pathway ascriptions observed in this study. Specifically, two participants who originally '*cannot remember'* about the onset of their fear had subsequently ascribed to the '*always been this way'* category at retest. Additionally, three other participants who originally ascribed to a particular pathway had ascribed to the '*cannot remember'* category at a subsequent retest. The previous study by Taylor et al. (1999) could not definitively conclude that participants had either remembered or forgotten events during the retest period because such scenarios were only deduced from the changes in pathway ascriptions made on two different measures. The present study provides some clarification of this finding, and identified cases where memories of events changed during a retest period.

It is noteworthy that pathway ascriptions do not necessarily provide an accurate indication of the stability of retrospective recall. The present study found that some of the changes in pathway ascriptions were due to very minor variations in participants' reports. For example, one participant described a fearful encounter with heights when she was 2 years old, which resulted in the *classical conditioning* pathway being classified for her at Time 1. At Time 2, the participant described the same incident, but reported being unable to remember whether or not her fear had developed from that event, resulting in the *cannot remember* classification. In another example, a participant ascribed to the *multiple associative pathways* category at Time 1 as she reported that both herself (classical conditioning) and her brother (vicarious conditioning) were hurt from sliding down a cliff edge. At the Time 2 retest, she failed to mention the vicarious component (her brother) of the event, and had consequently been classified into the *classical conditioning* category. In these cases, it was not instability of memory of past experiences that contributed to the change in pathway ascriptions, but simply the level of detail that was reported on the OQ-II. Thus, an area warranting further development is to adjust the sensitivity of the classification criteria to allow for minor changes in participants' reports without over-emphasising the level of instability that is observed.

In addition to this possible exaggeration of instabilities, pathway ascriptions may have also masked the overall extent of instability that was observed. The present study identified several cases where substantial variations in reports were observed despite the ascription of pathways being consistent. For example, although one participant ascribed to the *non-associative traumatic events* pathway at both Time 1 and Time 2, the events that led to these ascriptions were completely different. Specifically, at Time 1, this participant described the following event she had experienced when she was 11 years-old:

> "At intermediate doing abseiling. I didn't do it because I was so scared."

At Time 2, this participant described the following event she had experienced when she was nine years-old (two years prior to the event reported at Time 1):

> "When I was 9 we had to walk across a high one-man bridge on camp and I felt uncomfortable. I didn't want to cross and I felt sick in the stomach, can't remember if I crossed it or not."

This suggests that the participant had remembered an earlier event during the retest interval, and thus reported different events on two questionnaires. Such a scenario represented one of the main examples of the instability of retrospective recall, but was however not detected through the study's hypothesis testing as the participant's pathway ascription remained the same. It is therefore possible that instabilities in retrospective recall may actually be masked by the ascription to a fear-onset pathway. Thus, examining the consistency of pathway ascriptions alone does not provide a full picture of potential changes over time. Indeed, over a retest period of three months between Time 1 and Time 2, 32% (n = 7) of the fearful group had omitted events at Time 2 that were previously reported at Time 1, and 18% (n = 4) had reported additional events at Time 2 that were not reported at Time 1. For the non-fearful group, 30% (n = 10) of participants had omitted events on the Time 2 questionnaire that were previously reported at Time 1, and almost 70% (n = 23) had reported additional events at Time 2 that were not reported at Time 1. Despite a short three-month retest interval, participants appeared to have remembered much more of their past height-related experiences. It is possible that participants had thought about their own scenario after the Time 1 test, or had asked family members about past height-related experiences, and had integrated new information that was subsequently described at Time 2. While the classification of onset pathways was largely unaffected by these changes, the extent of instability observed raises the question of whether pathway ascriptions are useful as an indicator of a person's past

experiences. It also raises the question of whether the information obtained at the later retests reflected a more accurate picture of the participants' past experiences. If so, future research could consider integrating similar follow-up tests in order to capture participants' experiences more fully.

HYPOTHESIS 3: EFFECTS OF INTERVENING EVENTS

The purpose of the study's third hypothesis was to examine the effect of any height-related experiences during the retest periods on fear severity. It also served as an attempt to rule out the additional experience of any external events as a contributing factor to instabilities in pathway ascriptions. Since none of the participants who reported intervening events had changes in their pathway ascriptions, there was a good indication that changes in ascriptions were not attributable to external influences or additional events that were experienced between the times of testing. This finding also implies that the present study did not identify any UCS revaluation processes that occurred within the 12-month period that would contribute to pathway changes. Despite the preliminary rule-out of intervening experiences as a contributor to pathway changes, the extent to which pathway instabilities are purely due to the limitations of retrospective memory remains uncertain, as many other factors have not been ruled out or controlled. For instance, as already noted, the possible over-sensitivity of the classification criteria may lead to unnecessary changes in pathway ascriptions. Participants may choose to report less detail on the follow-up retests as they have already described the information on previous questionnaires, which may result in unstable ascriptions. Another possible but unlikely explanation is that at any point in time, participants would choose to select the *always been fearful* pathway simply because that option requires much less time to complete the questionnaire.

Because of the small number of participants reporting intervening events or changes in their fear severity, the findings may be embedded with many chance effects and thus much of the implications in testing this hypothesis are still preliminary. For instance, ment or worsening of participants' height fear was mostly not confirmed by changes in AQ scores, it is unclear whether this finding was due to misperceptions of participant's own progress, lack of convergent validity with the AQ, or the effect of chance. With consideration to this limitation, several trends emerged from looking at the effects of intervening events on subjective change in fear severity. Of particular interest is that the non-fearful participants who described a height-related encounter were either not affected by the event, or had subsequently reduced their anxiety towards heights. One particular participant provided the following description:

> "I have had to climb up high for work, which has meant I've become even more comfortable with heights."

Furthermore, it appears that despite being in an anxious situation, non-fearful participants can be adaptive and exercise control over their fear. One participant rated an 8 out of 10 in terms of fear experienced at the following event:

> "[I was] climbing a rock climbing wall without a rope… got highish up couldn't work out how to get back down. Realised it would be a painful fall. Was worried for brief period then just calmed and did it."

This is in direct contrast to respondents from the fearful group who experienced similar incidents, where they commonly described not being able to function.

> "We crossed a rope bridge 2 months ago. I had to return the long way; it caused such anxiety I was left shaking and crying for 10 minutes. I feel far more frightened of heights now."
>
> "The roof needed painting, so I forced myself up the ladder to help paint. I really struggled, I cried and shook, and had problems getting up and down."
>
> "Friends encouraged me to climb a tree. Got half way up and froze. Felt terrified and couldn't think properly. Couldn't move, and ended up going back down."

This contrast makes sense since it would be easier for a non-fearful person to confront a particular stimulus when the person does not fear it, despite it causing extreme fear at the time. However, the finding that people may develop greater mastery or competency through aversive exposures is difficult to reconcile from the classical conditioning model. There is also a clinical implication that, unless exposures are experienced in a controlled environment such as during systematic desensitization therapy, those who are height-fearful would likely become more fearful through encounters with heights in their everyday environment.

SUMMARY OF LIMITATIONS AND FUTURE RECOMMENDATIONS

Several of this study's limitations have already been noted. Namely, the small size of the height-fearful and non-fearful groups was an issue, and was insufficient for conducting particular statistical analyses. Much of the results obtained in the present study need to be verified through testing a larger sample group. With less than five participants being classified into most of the pathway categories, there is a substantial limitation in the ability to examine the extent of instability present for each individual onset pathway. It is acknowledged that some of the recommended sample size requirements (e.g., about 400 participants to conduct a *t*-test with a small effect size; Cohen, 1988) are often not met by research with student populations, especially when the target group of height-fearful students only represent a small percentage of the population. Nevertheless, future studies should adopt a more widespread recruitment strategy to help increase the size of the sample groups.

Biases

In terms of instrumental limitations, several features of the OQ-II have been identified as potentially problematic to the validity of the research. In this field of study, the

choice of instruments alone has been shown to affect subsequent findings about the prevalence of different pathway ascriptions (e.g., Jones & Menzies, 1995; Kirkby, Menzies, Daniels & Smith, 1995). Before the development of the original OQ and subsequently the OQ-II, an instrument commonly used in this area of research was the Phobic Origins Questionnaire (POQ; Öst & Hugdahl, 1981). This questionnaire required participants to attribute their phobia onset to one of Rachman's three pathways, and has been criticised for imposing a heavy bias towards the endorsement of associative conditioning pathways as the source of fear (Menzies, Kirkby, & Harris, 1998). The OQ was developed to reduce such biases by not forcing participants into certain onset pathways, and to allow participants to also endorse non-associative fear onset pathways. However, the OQ and OQ-II adopt a very lenient criterion for participants to be classified to a non-associative category. As the questionnaire does not require those who believe they have always been fearful to complete the rest of the questionnaire, participants only need to indicate through answering one question that they were always fearful of heights to rule out the significance of any height-related experiences in the development of their fear. This is effectively a form of causal attribution similar to that commanded by the POQ – a feature that Menzies and Clarke (1993b) critiqued and aimed to resolve through the development of the OQ. With an overly simplistic method of ruling out the role of associative experiences in the development of fear, there would likely be a bias towards the endorsement of non-associative pathways.

Comparability with previous research

While the present study aimed to systematically replicate previous studies by Menzies and Parker (2001) and Taylor et al. (1999), various aspects of the study's design created some limitations in the comparability of this study to previous studies. Firstly, this study established an additional *multiple associative pathways* category that neither of the previous studies adopted. The justification for introducing this new

pathway category had been outlined in the Measures section. Specifically, the researcher perceived a need to isolate and exclude cases where both associative and non-associative factors accounted for the development of fear. By having an additional pathway distinguishing a mix of associative pathways (multiple associative pathways) from the mix of both associative and non-associative pathways (mixed pathways), the likely consequence was an increased chance for instability of pathway ascriptions to be identified. For example, one participant changed from the *vicarious conditioning* ascription at Time 1 to the *multiple associative pathways* ascription at Time 2 because she reported additional classical conditioning components to the event. Since the reported events were largely the same between the two questionnaires, this participant's pathway ascriptions may have been stable over time if the *multiple associative pathway* category was not an available classification. Another consequence was the increased number of participants who were excluded from the analysis. Currently, the literature does not provide a theoretical conceptualisation for the combined influence of conditioning and non-associative traumatic experiences in the development of fear. Thus, these cases are essentially contradictory within the non-associative framework, and cannot be classified as either an associative or non-associative pathway. The present study identified two participants who ascribed to *mixed pathways*, and were subsequently excluded from the analysis for Hypothesis 1. These consequences did not appear to have a large effect on the findings, but they may have a more substantial impact on studies with larger sample groups, where more incidences of these categories may be identified. Despite this, it would be useful for this approach to be adopted in future studies until a suitable conceptualisation is established to offer an alternative to the *mixed pathway* category.

Another threat to the comparability of this study was that it involved three times of questionnaire administration as opposed to Taylor et al.'s (1999) study which involved

two. As previously discussed (see page 55), this study could not clearly obtain data on the instability of pathway ascriptions over 12 months. Thus, while this study found lower rates of pathway change compared to Taylor et al.'s study, it is unclear to what extent this difference is attributable to this study's use of greater instrumental consistency or simply to the shorter retest periods adopted. It is possible to argue that, since three participants had ascribed to different pathways both between Times 1 and 2 and Times 2 and 3, there were 7 out of 22 participants (31.82%) who had unstable pathway ascriptions at some point over a 12-month period. However, this argument is problematic since this level of instability would likely have been elevated due to an intervening Time 2 questionnaire, which had effectively doubled the chance of identifying instabilities over a 12-month period. Thus, the current study's data on instability over nine months (27.3% instability) would be the best indicator for comparison with Taylor et al.'s 12-month stability data.

Future directions

The present study had identified several aspects that warrant further investigation and clarification. Primarily, a replication with a larger sample would enable more between-group comparisons to be made, and would provide more conclusive results. The relative ease of ascribing to the *always been fearful pathway* on the OQ-II could potentially mean a premature exclusion or rule-out of the etiological significance of any associative experiences. Future studies should instruct participants to complete the whole OQ-II despite reporting that they had always been fearful. This would enable greater exploration of the influence of associative experiences on those who have already developed their fear through non-associative pathways. This may potentially provide better insight into the process of habituation in terms of how fearful or non-fearful exposures may help to reduce dishabituated fears.

Review is also warranted on the classification of non-traumatic events in questionnaire research. Current classification criteria are too sensitive to minor details of the accounts given, and the report of UCS may easily be omitted without thorough exploration of the event. Ideally, participant reports on the questionnaire should accompany, or at least be clarified by, information obtained through personal interviews, as taken by Menzies and Parker (2001).

Replication of this study with a clinically height-phobic sample would have greater clinical implications in relation to the role of the onset event and subsequent experiences on the long-term development and maintenance of height fear. Further use of the OQ-II with a clinical sample would also provide broader information about the psychometric qualities of this instrument. Also, assuming that people with clinically severe levels of phobia will report more extreme experiences of prior fear, panic, or stress, the reliability of their accounts may be less subject to the biases associated with the sensitivity of the classification method.

CONCLUSION

In summary, this study provided greater insight into the origins of height fear and how past height-related events are reported. The findings demonstrated the limitations of associative theories insofar as aversive experiences were found to be both insufficient and unnecessary for the acquisition of height fear (Field, 2006a; Poulton & Menzies, 2002a). Furthermore, the role of non-associative pathways on the acquisition of this evolutionary-relevant fear is comparable to that of traditional associative pathways. However, having identified substantial variations in the report of past height-related experiences over time, the reliability of retrospective accounts

for exploring fear onset was rightly put into question (Taylor et al., 1999). The present study provided further support for the limitations of retrospective recall, and identified several methodological shortcomings that future studies should aim to address in their enquiry into the onset of fears and phobias.

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APPENDIX A

Phase 1 Survey Pack

- Phase1 information sheet
- Phase 1 WebCT flyer
- Fear Survey Schedule-II (FSS-II)

Pathways to Fear

INFORMATION SHEET 1 (Phase 1)

Researcher(s) Introduction
The researcher for this project is Dr Joanne Taylor from the School of Psychology. The study is about different types of fears and how those fears originate. A research assistant, Edwin Chin, will be involved in collecting data for the project.

Participant Recruitment
The study has two phases, Phase 1 and Phase 2. This Information Sheet relates to Phase 1, in which you are invited to fill out a screening questionnaire about different types of fears. The screening questionnaire will be used in two ways. Firstly, it will be used to select participants for Phase 2, which involves completing a further questionnaire at three points in time over the course of approximately one year – at inclusion in Phase 2, and then at 6 and 12 months later. Secondly, the information regarding common types of fears will be analysed in an aggregated form and published. The information from the study will be used to further our knowledge about how different types of fears originate and the ways that people explain how their fears develop.

The types of fears that are most commonly and strongly reported in the screening questionnaire will be used to select participants for Phase 2. There will be two to three groups of participants who describe different types of fears. If participants describe a number of fear types, they will be selected for one fear type only. A control group with no fear will be recruited and matched for age similarity and sex to those in the relevant fear type group.

If you complete Phase 1 but are not selected for Phase 2, you will be informed about this through an emailed or posted letter. Information on how to access support if needed will also be provided.

Your participation in the study will remain confidential. Your name and contact details are required to contact you regarding Phase 2 of the study and to provide you with a summary of the results. Your questionnaires will be given a three-digit code number by the research assistant and kept separate from your name and contact information.

Neither grades nor academic relationships with your Department, School, or members of staff will be affected by either refusal or agreement to participate.

Participants in Phase 2 of the study will be offered reimbursement for the time taken to complete the questionnaires with a $20 voucher, after completion of the first of the three questionnaires.

If you experience discomfort at describing details of any fear(s) you may have, you can contact Dr Taylor (see the contact details below) who will provide information about how to access any support you might need. This might include contacting Student Counselling through their website or on-campus services, or discussing other ways you can access support.

Project Procedures
The data will be used to select participants for Phase 2 of the study, which will explore how fear onset is described over time. Questionnaires will be given a three-digit code number and, once completed, will be stored in a locked filing cabinet separate from participants' details. Data will be destroyed at the end of the five-year storage period. A summary of the results of the study will be provided to all participants (including those who participate in Phase 1 only) at the conclusion of the project.

Participant Involvement
The screening questionnaire will take approximately five to ten minutes to complete and can be mailed to the researcher using the freepost envelope provided.

Participant's Rights
You are under no obligation to accept this invitation. If you decide to participate, you have the right to:

- decline to answer any particular question;
- withdraw from the study (specify timeframe);
- ask any questions about the study at any time during participation;
- provide information on the understanding that your name will not be used unless you give permission to the researcher;
- be given access to a summary of the project findings when it is concluded.

Support Processes
Participants can contact Dr Taylor in the School of Psychology (extension 2065, J.E.Taylor@massey.ac.nz) if any issues arise in participating in Phase 1 of the study.

Project Contacts
Contact Dr Taylor in the School of Psychology (extension 2065, J.E.Taylor@massey.ac.nz) for further information about the study.

This project has been reviewed and approved by the Massey University Human Ethics Committee: Southern B, Application 06/50 *(insert application number).* If you have any concerns about the conduct of this research, please contact Dr Karl Pajo, Chair, Massey University Human Ethics Committee: Southern B, telephone 04 801 5799 x 6929, email humanethicsouthb@massey.ac.nz

Pathways to Fear

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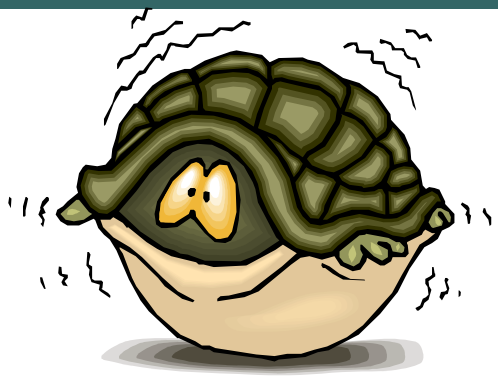

Dear class member

My name is Joanne Taylor and I am a Lecturer and clinical psychologist in the School of Psychology. My research assistant, Edwin Chin, and I would like to find out about the kinds of things people are afraid of and how they explain how the fear developed.

- ***Who can take part?***
  We need participants who experience fear in relation to some object or situation, as well as a control group of people with no such fear. So you can keep reading regardless of whether you have a fear or not.

- ***How do I find out more?***
  The link below will take you to an information sheet which tells you about the study and leads you to an online survey as the first part of the study. The second part of the study is detailed in the information sheet.

- ***What's in it for me?***
  As well as participating in an interesting study, there's an opportunity to receive a $20 book voucher, which is explained in the information sheet.

- ***What do I do next?***
  Click on the following link to be taken to the information sheet and online survey:
  http://psych-research.massey.ac.nz/jtaylor/index.htm

Thanks for your time and consideration - I hope you are willing to help with the study.

Joanne Taylor, Lecturer in Clinical Psychology

Contact details:
T 64 6 350 5799 extension 2065
F 64 6 350 5673
E J.E.Taylor@massey.ac.nz

ID:

Fear Survey Schedule – II (FSS-II)

Below are 52 different stimuli that can cause fear in people. Please rate how much fear you feel using the following rating scale and record your answer in the space provided.

0 = None
1 = Very little fear
2 = A little fear
3 = Some fear
4 = Much fear
5 = Very much fear
6 = Terror

_____	1.	Sharp objects	_____	27.	Being with drunks
_____	2.	Being a passenger in a car	_____	28.	Illness or injury to loved ones
_____	3.	Dead bodies	_____	29.	Being self-conscious
_____	4.	Suffocating	_____	30.	Driving a car
_____	5.	Failing a test	_____	31.	Meeting authority
_____	6.	Looking foolish	_____	32.	Mental illness
_____	7.	Being a passenger in an airplane	_____	33.	Closed places
_____	8.	Worms	_____	34.	Boating
_____	9.	Arguing with parents	_____	35.	Spiders
_____	10.	Rats and mice	_____	36.	Thunderstorms
_____	11.	Life after death	_____	37.	Not being a success
_____	12.	Hypodermic needles	_____	38.	God
_____	13.	Being criticized	_____	39.	Snakes
_____	14.	Meeting someone for the first time	_____	40.	Cemeteries
			_____	41.	Speaking before a group
_____	15.	Roller coasters	_____	42.	Seeing a fight
_____	16.	Being alone	_____	43.	Death of a loved one
_____	17.	Making mistakes	_____	44.	Dark places
_____	18.	Being misunderstood	_____	45.	Strange dogs
_____	19.	Death	_____	46.	Deep water
_____	20.	Being in a fight	_____	47.	Being with a member of the opposite sex
_____	21.	Crowded places			
_____	22.	Blood	_____	48.	Stinging insects
_____	23.	Heights	_____	49.	Untimely or early death
_____	24.	Being a leader	_____	50.	Losing a job
_____	25.	Swimming alone	_____	51.	Automobile accident
_____	26.	Illness	_____	52.	Dentists

If selected, would you like to participate in the next phase of this study?

[ ] YES [ ] NO

APPENDIX B

Phase 1 Results Posting

- Phase 1 FSS-II results summary
- Phase 1 FSS-II results table

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Pathways to Fear

Dear research participant

Thank you for completing the screening questionnaire for Phase 1 of this study.

We are writing to invite you into Phase 2 of the study, which involves completing the enclosed questionnaire on three occasions as explained in the attached Information Sheet. Please complete the questionnaire on your own, and return it in the freepost envelope provided.

Once we have received your first completed questionnaire, we will send you your $20 bookstore voucher with the hope that you will complete the final two questionnaires when they are mailed to you. Please let us know if your contact details or mailing address change over the course of the study.

For your information, we have included a summary of the results of Phase 1 of the study below, which we hope you will find useful and interesting. Please contact Joanne Taylor (extension 2065, J.E.Taylor@massey.ac.nz) if you have any questions about the study.

Thank you once again for your participation in this study.

Joanne Taylor
Researcher

Edwin Chin
Research Assistant
School of Psychology

SUMMARY OF PHASE 1 RESULTS

There were 155 students who completed the questionnaire and 129 of them were female. The questionnaire asked about different kinds of fear, and items were rated on a 7-point scale from 0 ("No fear") to 6 ("Terror").

The item that was most highly feared was "Death of a loved one", for which 45% of participants rated 5 or 6. Other death-related items such as "Death" (median rating = 2) and "Early or untimely death" (median = 2) were ranked 4th and 6th respectively.

There were 26% of participants who nominated ratings of 5 or 6 for "Suffocation", making it the second-highest rated item. Third highest was "Illness or injury to loved ones" (23% rated 5 or 6).

The least-feared item was "Worms", with 77% of participants making a rating of zero. Other animal-related items included "Rats and mice" (median = 1), "Spiders" (median = 2), "Snakes" (median = 2), "Strange dogs" (median = 2), and "Stinging insects" (median = 2).

The next least-feared item was "God" (71% rated zero), followed by "Thunderstorms" (55%). No participant rated 5 or 6 for the item "Being with a member of the opposite sex", which was the 4th least-feared item. Other socially-related items include "Meeting someone for the first time" (median = 2), "Being misunderstood" (median = 1), "Being a leader" (median = 1) and "Speaking before a group" (median = 3). Approximately half of all participants rated zero or 1 on most of these social items.

The table on the following page provides the overall results for each item on the questionnaire.

Pathways to Fear – Phase 1 Results

The numbers represent the percentage of people who nominated a particular score for each item.

Item \ Score	0	1	2	3	4	5	6
Sharp objects	30	38	18	11	2	1	1
Being a passenger in a car	28	36	22	10	2	2	1
Dead bodies	21	16	14	25	11	6	6
Suffocating	10	10	18	19	18	16	9
Failing a test	7	15	19	36	14	7	2
Looking foolish	10	20	24	24	15	5	1
Being a passenger in an aeroplane	27	33	17	11	6	3	3
Worms	75	13	5	5	0	1	1
Arguing with parents	43	29	11	11	5	1	1
Rats and mice	37	21	16	13	7	5	2
Life after death	52	19	10	11	5	2	1
Hypodermic needles	31	17	20	16	9	3	3
Being criticised	9	28	22	25	10	5	1
Meeting someone for the first time	17	34	22	19	5	1	2
Roller coasters	26	20	11	16	10	7	10
Being alone	34	30	11	14	7	2	1
Making mistakes	13	28	26	22	6	4	1
Being misunderstood	21	31	21	17	5	6	1
Death	18	17	17	19	9	18	2
Being in a fight	18	23	19	21	10	7	2
Crowded places	38	21	19	13	4	5	1
Blood	55	22	10	9	2	2	1
Heights	11	16	18	20	15	10	9
Being a leader	32	25	20	17	4	1	1
Swimming alone	38	18	18	16	5	2	3
Illness	23	27	24	18	5	2	1

Item \ Score	0	1	2	3	4	5	6
Being with drunks	27	30	19	14	6	2	2
Injury to loved ones	5	8	16	25	22	19	4
Being self-conscious	23	24	20	18	9	4	2
Driving a car	44	26	15	9	3	2	0
Meeting authority	26	38	16	14	5	2	1
Mental illness	21	26	17	18	11	6	1
Closed places	23	22	17	18	10	7	2
Boating	37	25	17	11	5	3	1
Spiders	18	24	18	15	11	7	8
Thunderstorms	53	31	9	5	1	2	0
Not being a success	14	20	17	26	11	8	4
God	72	10	7	7	3	1	1
Snakes	14	20	22	19	11	12	3
Cemeteries	49	19	15	9	6	1	1
Speaking before a group	9	20	19	23	13	11	6
Seeing a fight	30	20	19	19	9	2	1
Death of loved one	6	4	8	19	19	28	16
Dark places	13	18	21	26	11	9	2
Strange dogs	11	23	22	24	10	7	3
Deep water	19	17	18	15	15	7	9
Being with a member of the opposite sex	55	28	7	8	2	0	0
Stinging insects	19	26	24	22	5	2	1
Untimely or early death	19	14	16	26	7	14	4
Losing a job	30	24	18	18	7	2	1
Automobile accident	11	18	19	21	18	7	5
Dentists	31	19	20	15	7	4	3

APPENDIX C

Phase 2 Results Posting

Pathways to Fear Study
Summary of Results

Study Procedure

At the beginning of last year, you were invited to complete a short screening questionnaire that looked at a range of fears. Then you were selected to take part in this study as a participant in one of two groups – the study group who described a fear of heights and the control comparison group who did not. At the end, there were 30 participants in the study group, made up of 28 women and 2 men, with an average age of 34 years. The non-fearful comparison group had 47 people (37 of whom were women), averaging 28 years of age.

You completed a questionnaire that asked about past height-related experiences, as well as how strongly anxious and avoidant you felt in relation to various height situations. The same questionnaire was filled out on three occasions over a period of twelve months, to look at whether your responses changed over time.

Study aims

There were two main goals of the study you took part in:

1. The first goal was to investigate the ways people describe how their height fear developed. Of particular interest was whether people would describe mostly classical conditioning-type events, such as being frightened in a situation involving heights, and whether these events were experienced by you personally, witnessed by you, or in information provided to you by others or the media. I was also interested in whether height-fearful people have developed their fear without experiencing any frightening or conditioning-like events involving heights. This follows the belief that height fear is an evolutionary-relevant fear that has historically served a

survival value to humans as a land-dwelling species, and thus it is to some degree an innate fear that does not need to be conditioned. Thus, my first hypothesis was that most height-fearful people did not develop their fear through conditioning-like or unpleasant experiences with heights.

2. The second goal was to see whether these descriptions of height-related events change over time. By looking through the three questionnaires that each participant had returned over time, I noted how many of the reported events were omitted in later questionnaires. Similarly, I also looked for descriptions of events that were previously not reported in an earlier questionnaire. Through this I wanted to assess the level of unreliability that is associated with this type of methodology, and more generally, the appropriateness of using similar questionnaires as a way of investigating the pathways to fear.

Results

Participants from both the fearful and non-fearful groups provided many rather extraordinary, and sometimes traumatic, stories about their past experiences with heights. On most occasions, being exposed to heights itself was enough to cause a very frightened response, such as when standing at the top of a flight of stairs, or on a see-through glass floor in a tall building. Other cases resembled more classical conditioning-like situations, where an unpleasant or frightening event happened when the person was in a high place, such as being socially pressured into crossing a bridge, or being in a motor vehicle accident next to a cliff edge. Some of these events were found to be the major cause of persistent height fear, as participants reported that they were fearful of heights ever since, but not before, the events. The role of observation and modelling in the development of fear was found to be a lot less substantial. Some examples of these given by participants included watching a parent get hurt falling from a high place and seeing a friend have a panic attack while having to cross a high bridge.

Although these events could have played a role in developing or worsening participants' height fear, they were rarely found to be the cause of persistent fear. A particular finding of interest was that some participants felt fearful when seeing somebody else, most often children, being in a situation where they could fall or be injured because of heights. These cases do not fit into the model of observational learning of fears, because the person who was at risk of injury often did not show fearful expressions. The interesting question is whether our concern for other people's safety can influence our own anxieties over our safety, and play a role in the development of our fears.

Non-fearful participants in this study reported past height-related experiences that were just as extraordinary and traumatic! It was not uncommon for people in this group to have had fallen, or had been at risk of falling, down the side of a cliff-edge. Some participants had been stuck in a high place, such as a roof or in a tall tree , and needed to calm themselves down before being able to return back to ground. Quite a few participants also witnessed another person falling from a high place resulting in injury, with some rating the experience as being highly frightening for them. Despite having experienced such events, these participants did not proceed to develop severe height fear (hence they were in the 'non-fearful' group). This finding is important because it highlights the major criticism of conditioning theory that frightening experiences are insufficient for developing persistent fear. Furthermore, negative experiences were also found to be unnecessary in the development of fear, as almost half of the fearful participants reported that they could not remember a time when they were not fearful of heights, thus believing that their fear had developed before any negative experiences had occurred. Together, whether you were in the fearful or non-fearful group, your input into the study's questionnaire has helped set a clearer perspective on the limitations of conditioning theories in explaining the development of height fear.

In terms of stability of descriptions over time, it was found that a majority of participants from both the fearful and non-fearful groups had either reported additional events that were not described on earlier questionnaires, or had omitted previously described events on the follow-up questionnaires. As a result, approximately one in four of the fearful participants had varying descriptions across the three questionnaires in terms of what contributed to the development of their fear. While many factors can contribute to these changes over time, this finding highlights the extent to which people can remember or forget past experiences within a short period of time. It also raises the question of whether using standardized questionnaires is the best way to look at past experiences and their role in fear onset. Also we may want to look at whether the wording of some of the questions can be changed to improve the stability of responses. It seems that we're again faced with the age-old dilemma of whether to compromise the consistency and replicability of standardized tests for more in-depth and comprehensive information from interviews.

In summary, the take-home messages from the study are:

- Height fear can be innate or acquired.
- Conditioning events can, but not necessarily, lead to persistent fear, irrespective of the level of fear or trauma experienced during these events.
- People can remember or forget events over a short period of time.
- There are limitations in the use of standardized tests to explore pathways to fear onset as strict criteria may overemphasize the instability of people's reports.

Please feel free to contact me at edwin.chin.psych@gmail.com if you would like to ask about some other specific aspects of the study's findings, or if you have any further queries about this study.

APPENDIX D

Phase 2 Survey Pack

- Phase 2 information sheet
- Consent form
- Thank-you and acknowledgement letter

Pathways to Fear

INFORMATION SHEET 2 (Phase 2)

Researcher(s) Introduction
The researcher for this project is Dr Joanne Taylor from the School of Psychology. The study is about different types of fears and how those fears originate. A research assistant, Edwin Chin, will be involved in collecting data for the project.

Participant Recruitment
The study has two phases – Phase 1 and Phase 2. This Information Sheet relates to Phase 2, in which you are invited to complete a questionnaire about a fear you identified in Phase 1 (the screening questionnaire) and its origin. You will be asked to fill out the questionnaire at three points in time over the course of approximately one year – at inclusion in the study, and at 6 and 12 months later. The information from the study will be used to further our knowledge about how different types of fears originate and the ways that people explain how their fears develop.

The types of fears that are most commonly and strongly reported in the screening questionnaire have been used to select participants for this phase of the research. There are (insert number) groups of participants who have described different types of fears and a control group with no fear that has been matched for age similarity and sex to those in your fear type group.There are 50 participants in each fear type group and the control group to permit basic statistical analysis.

Your participation in the study will remain confidential. Your name and contact details are required to mail out the questionnaires and to provide you with a summary of the results. You will be contacted once per questionnaireby email or telephone if needed as a reminder to return the questionnaire. Your questionnaires will be given a three-digit code number by the research assistant and kept separate from your name and contact information.

Neither grades nor academic relationships with your Department, School, or members of staff will be affected by either refusal or agreement to participate.

Participants in Phase 2 of the study will be offered reimbursement for the time taken to complete the questionnaires with a $20 voucher, after completion of the first of the three questionnaires.

If you experience discomfort at describing details of any fear(s) you may have, you can contact Dr Taylor (see the contact details below) who will provide information about how to access any support you might need. This might include contacting Student Counselling through their website or on-campus services, or discussing other ways you can access support.

Project Procedures
The data will be used to explore how fear onset is described over time. Questionnaires will be given a three-digit code number and, once completed, will be stored in a locked filing cabinet separate from participants' details. Data will be destroyed at the end of the five-year storage period. A summary of the results of the study will be provided to participants at the conclusion of the project.

Participant Involvement
Each questionnaire will takes approximately 30-40 minutes to complete and questionnaires will be mailed at inclusion in the study, and 6 and 12 months later (i.e., a maximum of 120 minutes). All questionnaires can be mailed to the researcher using the freepost envelopes provided.

Participant's Rights
You are under no obligation to accept this invitation. If you decide to participate, you have the right to:

- decline to answer any particular question;
- withdraw from the study (specify timeframe);
- ask any questions about the study at any time during participation;

- provide information on the understanding that your name will not be used unless you give permission to the researcher;
- be given access to a summary of the project findings when it is concluded.

Support Processes
Participants can contact Dr Taylor in the School of Psychology (extension 2065, J.E.Taylor@massey.ac.nz) if any issues arise in participating in the study.

Project Contacts
Contact Dr Taylor in the School of Psychology (extension 2065, J.E.Taylor@massey.ac.nz) for further information about the study.

This project has been reviewed and approved by the Massey University Human Ethics Committee: Southern B, Application 06/50. If you have any concerns about the conduct of this research, please contact Dr Karl Pajo, Chair, Massey University Human Ethics Committee: Southern B, telephone 04 801 5799 x 6929, email humanethicsouthb@massey.ac.nz

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Pathways to Fear

Dear research participant

Thank you for completing the screening questionnaire for Phase 1 of this study and for recently returning the first of the three Phase 2 questionnaires. We very much appreciate the time and effort you have given to take part.

As promised, we are sending your $20 bookstore voucher in the hope that you will complete the second and third Phase 2 questionnaires in 3 and 12 months' time. We will send you a summary of the results once all of the data has been collected and analysed.

Thank you once again for your participation in this study. Please contact Joanne Taylor (extension 2065, J.E.Taylor@massey.ac.nz) if you have any questions about the study, or if your contact details change during the course of the study.

Many thanks and best wishes

Joanne Taylor
School of Psychology

Edwin Chin
Research Assistant

APPENDIX E

Fear-Group Questionnaire

- Intervening events questionnaire (at Times 2 & 3 only)
- Origins Questionnaire – II (OQ-II)
- Acrophobia Questionnaire (AQ)
- State-Trait Anxiety Inventory – Form Y-2 (STAI-T Y-2)
- Help-seeking questionnaire

Pathways to Fear
Fear Origin Questionnaire

Date: May 08

ID: F_____

This questionnaire asks about your fear of **Heights** that you indicated on the Screening Questionnaire in Phase 1 of this study.

You have the right to decline to answer any particular question.

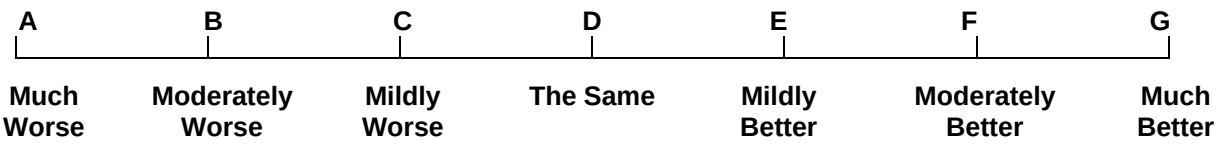
SECTION 1

1A Have you had an accident involving heights in the past nine months (i.e. since you completed the last questionnaire)?

YES ☐ → If Yes, when? _____ weeks ago.
NO ☐

1B Please describe this accident or anything else that happened since you completed the last questionnaire which has influenced your opinion towards heights in any way (e.g., avoid more/less high places or situations, worry about it more/less).

1C Please indicate on the scale below the degree to which your height-related fear has become better or worse in the past nine months.



1D Can you remember when your fear of heights **first** appeared? That is, can you recall the **very first** actual occasion where you were excessively fearful or anxious in the presence of heights? (Please choose one of the three alternatives below and circle the appropriate letter: A, B, or C. If none of these alternatives seem appropriate, please explain why in the space headed **Comments** provided below).

A. YES. I can clearly remember the **first** occasion where I was excessively fearful or anxious in the presence of heights.

B. NO. Although I clearly remember a time before my fear developed when I was not even mildly distressed by heights, I cannot remember the **first** occasion where I was excessively fearful or anxious.

C. NO. I cannot remember the first occasion because I have **always** been fearful or anxious in the presence of heights.

Comments

Instructions

If you chose alternative A, please continue question 2A on the next page.

If you chose alternative B, do not answer any part of Section 2. Please continue on **page 6**.

If you chose alternative C, or none of the three alternatives, please continue on **page 18**.

SECTION 2

2A In the space provided below, describe the events of that **very first** occasion where you were excessively fearful or anxious in the presence of heights.

2B How old were you at the time of this initial fear incident? _____ years

2C Have you been excessively fearful of heights ever since this initial incident? YES ☐ NO ☐

2D Were you ever able to confront heights with complete ease after this initial fear incident? YES ☐ NO ☐

2E Were you excessively fearful of heights **before** this incident/s? YES ☐ NO ☐

2F Please indicate which of the following symptoms you experienced during the incident. Be sure to only tick 'Yes' for the symptoms you actually remember having in that initial fearful incident.

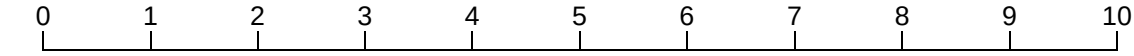
	YES	NO
Difficulty breathing / shortness of breath		
Pounding / throbbing heart / palpitations		
Chest pain / discomfort		
Choking / smothering sensations		
Dizziness / vertigo / unsteady feelings		
Feeling you or your surroundings are strange or unreal		
Tingling in hands and feet		
Hot and cold flushes		
Sweating		
Faintness		
Trembling / shaking		
Fear of dying, going crazy, or losing control		

2G In the initial fear incident that you described on the previous page, was your fear preceded by **some other** upsetting event? i.e., on that occasion were you hurt, frightened, or distressed by **something else** when in the presence of heights?

YES ☐
NO ☐

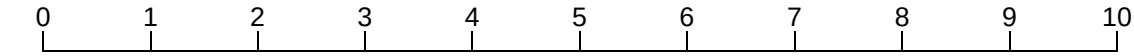
If YES, please specific what hurt, frightened, or distressed you.

2H How much fear or distress did you experience in the initial fear incident? (Please circle a number on the scale below.)



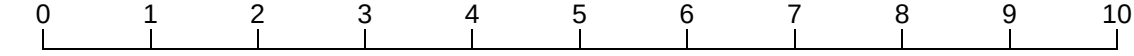
No fear — Worst fear I can imagine

2I Were you physically hurt in the initial fear incident? If yes, how much pain did you experience? (Please circle a number on the scale below.)



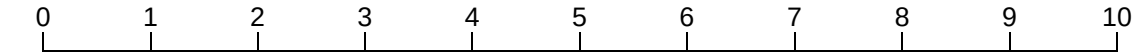
No pain — Worst pain I can imagine

2J We are interested in how you felt about heights **before** the distressing incident that you have described on the previous page. **Before** the initial fearful incident occurred, how dangerous did you think heights were? (Please circle a number on the scale below.)



Not dangerous at all — Deadly

2K **Before** the initial fear incident occurred, how much did you fear heights? (Please circle a number on the scale below.)



No fear — Worst fear I can imagine

2L In the time since the initial fear incident, has anything happened that has changed your view of what occurred that day? In particular, does the event seem more dangerous now than it did at the time?

YES ☐ → If YES, please provide details below.
NO ☐

2M At the time of the initial fear incident, do you recall any extra pressures in your life that you found stressful (e.g., financial, family, work or health problems, death of a close friend, etc.)? If you do recall such pressures, please describe them briefly below.

2N At the time of the initial fear incident, were you experiencing depression?

YES ☐ →
NO ☐

If YES, briefly describe this depressive period, including any medication or treatment that you received, in the space provided below.

2O In **<u>prior</u>** encounters with heights (i.e., in encounters **<u>before</u>** the initial fear incident), had anything similar ever happened to you? Please give details of any similar prior encounters with heights, even if they didn't cause you distress or anxiety at the time.

2P In the time since this incident/s (described in 2O above), has anything happened that has changed your view of what occurred? In particular, does the event seem more dangerous now than it did at the time?

YES ☐ → If YES, please provide details below.
NO ☐

SECTION 3

The following sections relate mainly to the period in your life **before** you were excessively frightened or distressed in the presence of heights, i.e., **before** the first fear incident that you may recall.

3A When you became fearful of heights, did you know anyone else who was also fearful of heights?

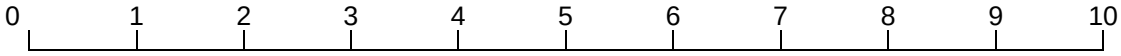
YES ☐ → What is your relationship with this person / these people? _____
NO ☐

3B Before you were fearful of heights, did you ever actually **see** someone become hurt, frightened, or distressed in the presence of heights?

YES ☐
NO ☐

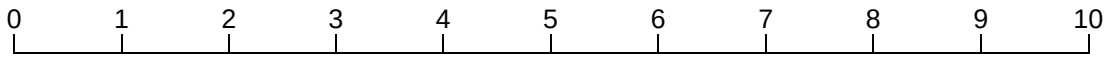
If YES, please describe the incident/s in the space provided below.
If NO, do not answer any more questions on this page. Please continue at question **3O** near the middle of **page 8**.

3C How much fear or distress did you experience in this incident? (Please circle a number on the scale below.)



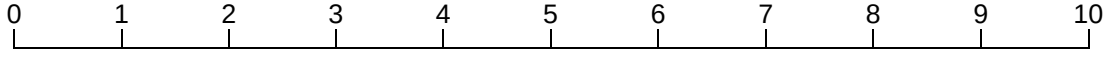
No fear — Worst fear I can imagine

3D We are interested in how you felt about heights **before** this incident. **Before** this incident occurred, how dangerous did you think heights were? (Please circle a number on the scale below.)



Not dangerous at all — Deadly

3E **Before** this incident occurred, how much did you fear heights?
(Please circle a number on the scale below.)



No fear — Worst fear I can imagine

3F Have you been excessively fearful of heights ever since the incident/s involving this person?

YES ☐
NO ☐

3G Were you ever able to confront heights with complete ease after the incident/s involving this person?

YES ☐
NO ☐

3H Were you excessively fearful of heights **before** this incident/s?

YES ☐
NO ☐

3I In the time since this incident, has anything happened that has changed your view of what occurred that day? In particular, does the event seem more dangerous now than it did at the time?

YES ☐ → If YES, please provide details below.
NO ☐

3J How old were you at the time of the incident/s involving this person that you described in question 3B on the previous page?

_____ years

3K At the time of the incident/s involving this person, do you recall any extra pressures in your life that you found stressful (e.g., financial, family, work, or health problems, death of a close friend, etc.)? If you do recall such pressures, please describe them briefly below.

3L At the time of the incident/s involving this person, were you experiencing depression?

YES ☐ →
NO ☐

If YES, briefly describe this depressive period, including any medication or treatment that you received, in the space provided below.

3M **Before** the incident/s involving this person, have you seen similar events involving another person being hurt or distressed in the presence of heights? Please describe any similar prior encounters, even if they didn't cause you distress or anxiety at the time.

3N In the time since this incident/s (described in 3N above), has anything happened that has changed your view of what occurred? In particular, does the event/s seem more dangerous now than it did at the time?

YES ☐ → If YES, please provide details below.
NO ☐

3O Before you were fearful of heights, did anyone ever tell you unpleasant stories involving heights, or warn you of some danger associated with heights?

YES ☐
NO ☐

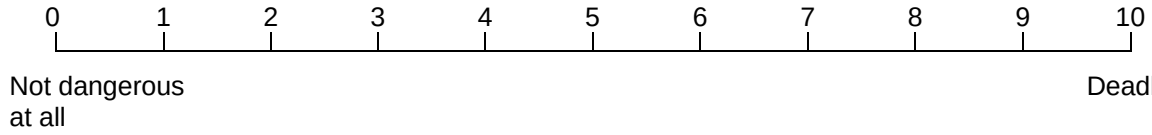
If YES, please describe the nature of the stories or warnings and who told them to you in the space provided below.
If NO, please turn to the middle of **page 11** and continue at question **4A.**

3P How much fear or distress did you experience when you were told these stories or warnings? (Please circle a number on the scale below.)

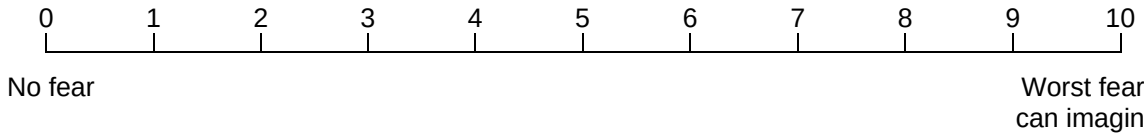
0 1 2 3 4 5 6 7 8 9 10

No fear — Worst fear I can imagine

3Q We are interested in how you felt about heights **before** you were told these stories or warnings. **Before** this incident occurred, how dangerous did you think heights were? (Please circle a number on the scale below.)



3R **Before** this incident occurred, how much did you fear heights? (Please circle a number on the scale below.)



3S Have you been excessively fearful of heights ever since you were told the stories or warnings that you described on the previous page?

YES ☐
NO ☐

3T Were you ever able to confront heights with complete ease after you were told these stories or warnings?

YES ☐
NO ☐

3U Were you excessively fearful of heights **before** you were told these stories or warnings?

YES ☐
NO ☐

3V In the time since these stories or warnings, has anything happened that has changed your view of them? In particular, do heights seem more dangerous now than it did at the time?

YES ☐ → If YES, please provide details below.
NO ☐

3W How old were you at the time when you were told these stories or warnings?

_____ years

3X At the time that you were told these stories or warnings, do you recall any extra pressures in your life that you found stressful (e.g., financial, family, work, or health problems, death of a close friend, etc.)? If you do recall such pressures, please describe them briefly below.

3Y At the time that you were told these stories or warnings, were you experiencing depression?

YES ☐ → If YES, briefly describe the depressive periods, including any medication or treatment that you received in the space below.

NO ☐

3Z **<u>Before</u>** you were told these stories or warnings, were you told any similar stories or warnings? Please give details of any similar prior encounters with height-related stories/warnings, even if they didn't cause you distress or anxiety at the time.

3AA In the time since this incident/s (described in 3Z above), has anything happened that has changed your view of what occurred? In particular, does the event seem more dangerous now than it did at the time?

YES ☐ → If YES, please provide details below.

NO ☐

SECTION 4

4A Did you ever read, see on television or at the movies, or hear on the radio, anything unpleasant about heights?

YES ☐ → If YES, please describe the incident/s in the space provided below.
NO ☐ → If NO, please turn to **page 13** and continue at question **5A.**

4B How much fear or distress did you experience in this incident? (Please circle a number on the scale below.)

0 1 2 3 4 5 6 7 8 9 10

No fear — Worst fear I can imagine

4C We are interested in how you felt about heights **before** this incident. **Before** this incident occurred, how dangerous did you think heights were? (Please circle a number on the scale below.)

0 1 2 3 4 5 6 7 8 9 10

Not dangerous at all — Deadly

4D **Before** this incident occurred, how much did you fear heights?
(Please circle a number on the scale below.)

0 1 2 3 4 5 6 7 8 9 10

No fear — Worst fear I can imagine

4E Have you been excessively fearful of heights ever since the incident/s that you described above?

YES ☐
NO ☐

4F Were you ever able to confront heights with complete ease after this incident/s?

YES ☐
NO ☐

4G Were you excessively fearful of heights **before** this incident/s?

YES ☐
NO ☐

4H In the time since this incident/s, has anything happened that has changed your view of what occurred that day? In particular, does the event seem more dangerous now than it did at the time?

YES ☐ → If YES, please provide details below.
NO ☐

4I How old were you at the time of the incident/s that you described on the previous page?

_____ years

4J At the time of the incident/s described on the previous page, do you recall any extra pressures in your life that you found stressful (e.g., financial, family, work, or health problems, death of a close friend, etc.)? If you do recall such pressures, please describe them briefly below.

4K At the time of the incident/s described on the previous page, were you experiencing depression?

YES ☐ →
NO ☐

If YES, briefly describe the depressive periods, including any medication or treatment that you received in the space below.

4L **<u>Before</u>** the media event you saw or heard (described in 4A), have you seen or heard similar media events? Please give details of any similar prior encounters with height-related media events, even if they didn't cause you distress or anxiety at the time.

4M In the time since this incident/s (described in 4L), has anything happened that has changed your view of what occurred? In particular, does the event/s seem more dangerous now than it did at the time?

YES ☐ → If YES, please provide details below.
NO ☐

SECTION 5

5A Were you ever hurt or injured in the presence of heights?

YES ☐ → If YES, please describe the incident/s in the space provided below.
NO ☐ → If NO, please turn to **page 15** and continue at question **6A.**

5B How much fear or distress did you experience in this incident? (Please circle a number on the scale below.)

0 1 2 3 4 5 6 7 8 9 10

No fear — Worst fear I can imagine

5C Were you physically hurt in the initial fear incident? If yes, how much pain did you experience? (Please circle a number on the scale below.)

0 1 2 3 4 5 6 7 8 9 10

No pain — Worst pain I can imagine

5D We are interested in how you felt about heights **before** this incident. **Before** this incident occurred, how dangerous did you think heights were? (circle a number on the scale below.)

0 1 2 3 4 5 6 7 8 9 10

Not dangerous at all — Deadly

5E **Before** this incident occurred, how much did you fear heights?
(Please circle a number on the scale below.)

0 1 2 3 4 5 6 7 8 9 10

No fear — Worst fear I can imagine

5F Have you been excessively fearful of heights ever since the incident/s that you described above?

YES ☐
NO ☐

5G Were you ever able to confront heights with complete ease after this incident/s?

YES ☐
NO ☐

5H Were you excessively fearful heights **before** this incident/s?

YES ☐
NO ☐

5I In the time since this incident, has anything happened that has changed your view of what occurred that day? In particular, does the event seem more dangerous now than it did at the time?

YES ☐ → If YES, please provide details below.
NO ☐

5J How old were you at the time of the incident/s that you described on the previous page?

_____ years

5K At the time of the incident/s described on the previous page, do you recall any extra pressures in your life that you found stressful (e.g., financial, family, work, or health problems, death of a close friend, etc.)? If you do recall such pressures, please describe them briefly below.

5L At the time of the incident/s described on the previous page, were you experiencing depression?

YES ☐ →
NO ☐

If YES, briefly describe the depressive periods, including any medication or treatment that you received in the space below.

5M In **prior** encounters with heights (i.e., in encounters **before** the incident described), had anything similar ever happened to you? Please give details of any similar prior encounters with heights, even if they didn't cause you distress or anxiety at the time.

5N In the time since this incident (described in 5M), has anything happened that has changed your view of what occurred? In particular, does the event/s seem more dangerous now than it did at the time?

YES ☐ → If YES, please provide details below.
NO ☐

SECTION 6

6A Can you recall any earlier occasions in which you were at least mildly anxious or fearful in the presence of heights?

YES ☐ → If YES, please describe the incident/s in the space provided below.
NO ☐ → If NO, please turn to **page 17** and continue at **question 6N.**

6B How much fear or distress did you experience in this incident? (Please circle a number on the scale below.)

0 1 2 3 4 5 6 7 8 9 10

No fear — Worst fear I can imagine

6C We are interested in how you felt about heights **before** this incident. **Before** this incident occurred, how dangerous did you think heights were? (Please circle a number on the scale below.)

0 1 2 3 4 5 6 7 8 9 10

Not dangerous at all — Deadly

6D **Before** this incident occurred, how much did you fear heights?
(Please circle a number on the scale below.)

0 1 2 3 4 5 6 7 8 9 10

No fear — Worst fear I can imagine

6E Have you been excessively fearful heights ever since the incident/s that you described above?

YES ☐
NO ☐

6F Were you ever able to confront the heights with complete ease after this incident/s?

YES ☐
NO ☐

6G Were you already excessively fearful of heights **before** this incident/s?

YES ☐
NO ☐

6H In the time since this incident, has anything happened that has changed your view of what occurred that day? In particular, does the event seem more dangerous now than it did at the time?

YES ☐ → If YES, please provide details below.
NO ☐

6I How old were you at the time of the incident/s that you described on the previous page?

_____ years

6J At the time of the incident/s described on the previous page, do you recall any extra pressures in your life that you found stressful (e.g., financial, family, work, or health problems, death of a close friend, etc.)? If you do recall such pressures, please describe them briefly below.

6K At the time of the incident/s described on the previous page, were you experiencing depression?

YES ☐ →
NO ☐

If YES, briefly describe the depressive periods, including any medication or treatment that you received in the space below.

6L In **prior** encounters with heights (i.e., in encounters **before** the incident described), had anything similar ever happened to you? Please give details of any similar prior encounters with heights, even if they didn't cause you distress or anxiety at the time.

6M In the time since this incident/s (described in 6L), has anything happened that has changed your view of what occurred? In particular, does the event/s seem more dangerous now than it did at the time?

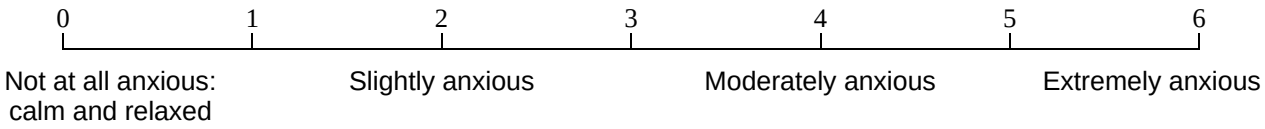
YES ☐ → If YES, please provide details below.
NO ☐

6N In the space provided below, please describe anything that you believe is relevant to the understanding of the onset of your fear of heights that has not been covered in this questionnaire.

SECTION 7A

Fear of Heights – Part 1: Anxiety Scale

Below we have compiled a list of situations involving height. Imagine how anxious (tense, uncomfortable) you would feel if you were in each of these situations. Please indicate how you imagine you would feel by putting one of the following numbers (0, 1, 2, 3, 4, 5, or 6) corresponding to the scale below in the space to the left of each item.

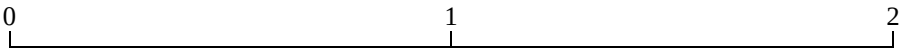


Rate item here		
	1	Diving off the low board at a swimming pool.
	2	Stepping over rocks crossing a stream.
	3	Looking down a circular stairway from several flights up.
	4	Standing on a ladder leaning against a house, second storey.
	5	Sitting at the front of the second balcony of a theatre.
	6	Riding a Ferris wheel.
	7	Walking up a steep incline while hiking.
	8	Taking an aeroplane trip.
	9	Standing next to an open window on the third floor.
	10	Walking on a footbridge over a highway.
	11	Driving over a large bridge.
	12	Being away from the window in an office on the 15th floor of a building.
	13	Seeing window washers ten flights up on a scaffold.
	14	Walking over a footpath grating.
	15	Standing on the edge of a railway platform.
	16	Climbing up a fire escape to the 3rd floor landing.
	17	On the roof of a ten storey apartment building.
	18	Taking a lift to the 50th floor.
	19	Standing on a chair to get something off a shelf.
	20	Walking up the boarding gangplank of a large boat.

SECTION 7B

Fear of Heights – Part 2: Avoidance Scale

Now that you have rated each item according to anxiety, we would like you to rate the items in terms of avoidance. Using the following rating scale, indicate in the space to the left of the items below how much you would now avoid the situation, if it arose.



Would not avoid doing it | Would try to avoid doing it | Would not do it under any circumstances

Rate item here		
	1	Diving off the low board at a swimming pool.
	2	Stepping over rocks crossing a stream.
	3	Looking down a circular stairway from several flights up.
	4	Standing on a ladder leaning against a house, second storey.
	5	Sitting at the front of the second balcony of a theatre.
	6	Riding a Ferris wheel.
	7	Walking up a steep incline while hiking.
	8	Taking an aeroplane trip.
	9	Standing next to an open window on the third floor.
	10	Walking on a footbridge over a highway.
	11	Driving over a large bridge.
	12	Being away from the window in an office on the 15th floor of a building.
	13	Seeing window washers ten flights up on a scaffold.
	14	Walking over a footpath grating.
	15	Standing on the edge of a railway platform.
	16	Climbing up a fire escape to the 3rd floor landing.
	17	On the roof of a ten storey apartment building.
	18	Taking a lift to the 50th floor.
	19	Standing on a chair to get something off a shelf.
	20	Walking up the boarding gangplank of a large boat.

SECTION 8

Trait Anxiety

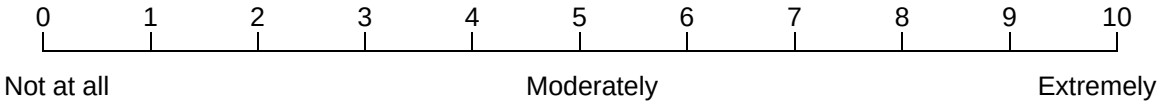
A number of statements which people have used to describe themselves are given below. Read each statement and then circle the number which indicates how you generally feel. There are no right or wrong answers. Do not spend too much time on any one statement, but give the answer which seems to describe your feelings best.

	Not at all	Somewhat	Moderately	Very much
I feel pleasant	1	2	3	4
I feel nervous and restless	1	2	3	4
I am satisfied with my life	1	2	3	4
I wish I could be as happy as others seem to be	1	2	3	4
I feel like a failure	1	2	3	4
I feel rested	1	2	3	4
I am “calm, cool, and collected”	1	2	3	4
I feel that difficulties are piling up so that I cannot overcome them	1	2	3	4
I worry too much over something that doesn’t really matter	1	2	3	4
I am happy	1	2	3	4
I have disturbing thoughts	1	2	3	4
I lack self-confidence	1	2	3	4
I feel secure	1	2	3	4
I make decisions easily	1	2	3	4
I feel inadequate	1	2	3	4
I am content	1	2	3	4
Some unimportant thought runs through my mind and bothers me	1	2	3	4
I take disappointments so keenly I can’t put them out of my mind	1	2	3	4
I am a steady person	1	2	3	4
I get in a state of tension or turmoil as I think over my recent concerns and interests	1	2	3	4

SECTION 9

Fear Intensity

1. How much does your fear of heights interfere with your daily functioning?



2. Have you ever spoken to any of the following people about your fear of heights?

(Please circle the letter(s) next to those relevant to you)

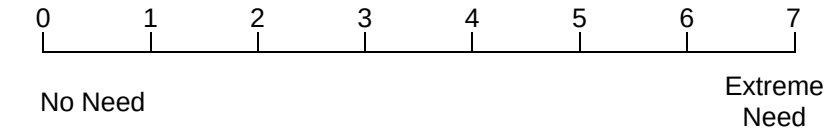
A	Mental health professional
B	Medical professional
C	Partner or spouse
D	Other family members
E	Friends
F	Other person (please specify):

3. Have you ever received psychological help from a mental health professional for any personal or emotional problems you have experienced?

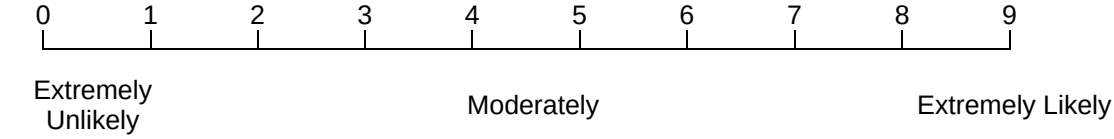
YES ☐

NO ☐

4. To what extent do you feel that you need professional psychological help for your fear of heights?



5. How likely is it that you would seek professional psychological help from a psychologist or counsellor for your fear of heights?



Thank you for completing this questionnaire

Please mail it using the envelope provided

APPENDIX F

Non-Fear Group Questionnaire

- Intervening events questionnaire (at Times 2 & 3 only)
- Origins Questionnaire – II Modified (OQ-II-M)
- Acrophobia Questionnaire (AQ)
- State-Trait Anxiety Inventory – Form Y-2 (STAI-T Y-2)

Pathways to Fear
Fear Origin Questionnaire

Date: May 08

ID: C_____

Note from researchers:
This questionnaire asks about the fear of **Heights.**

We acknowledge that you reported having no fear of heights in the Phase 1 Screening Questionnaire, but we would still like to know about your experiences with heights.

You have the right to decline to answer any particular question.

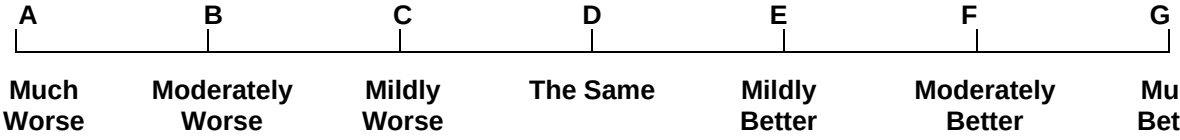
SECTION 1

1A Have you had an accident involving heights in the past nine months (i.e. since you completed the last questionnaire)?

YES ☐ → If Yes, when? _____ weeks ago.
NO ☐

1B Please describe this accident or anything else that happened since you completed the last questionnaire which has influenced your opinion towards heights in any way (e.g., avoid more/less high places or situations, worry about it more/less)?

1C Please indicate on the scale below the degree to which your height-related fear has become better or worse in the past nine months.



SECTION 2

2A Do you know anyone who is fearful of heights?

YES ☐
NO ☐

If YES, what is your relationship with this person / these people? _____

2B Did you ever actually **see** someone become hurt, frightened, or distressed in the presence of heights?

YES ☐ → If YES, please describe the incident/s in the space provided below.
NO ☐ → If NO, do not answer any more questions in this section. Continue at **3A** on **page 4**

2C How much fear or distress did you experience in this incident? (Please circle a number on the scale below.)

0 1 2 3 4 5 6 7 8 9 10

No fear — Worst fear I can imagine

2D We are interested in how you felt about heights **before** this incident. **Before** this incident occurred, how dangerous did you think heights were? (Please circle a number on the scale below.)

0 1 2 3 4 5 6 7 8 9 10

Not dangerous at all — Deadly

2E **Before** this incident occurred, how much did you fear heights?
(Please circle a number on the scale below.)

0 1 2 3 4 5 6 7 8 9 10

No fear — Worst fear I can imagine

2F Have you been excessively fearful of heights ever since the incident/s described in 2B?

YES ☐
NO ☐

2G Were you ever able to confront heights with complete ease after the incident/s?

YES ☐
NO ☐

2H Were you excessively fearful of heights **before** the incident/s?

YES ☐
NO ☐

2I In the time since this incident, has anything happened that has changed your view of what occurred that day? In particular, does the event seem more dangerous now than it did at the time?

YES ☐ → If YES, please provide details below.
NO ☐

2J How old were you at the time of the incident/s that you described in 2B?

_____ years

2K At the time of the incident/s, do you recall any extra pressures in your life that you found stressful (e.g., financial, family, work, or health problems, death of a close friend, etc.)? If you do recall such pressures, please describe them briefly below.

2L At the time of the incident/s, were you experiencing depression?

YES ☐ →
NO ☐

If YES, briefly describe this depressive period, including any medication or treatment that you received, in the space provided below.

2M **Before** the incident/s involving this person, have you seen similar events involving another person being hurt or distressed in the presence of heights? Please describe any similar prior encounters, even if they didn't cause you distress or anxiety at the time.

2N In the time since this incident/s (described in 2M above), has anything happened that has changed your view of what occurred? In particular, does the event/s seem more dangerous now than it did at the time?

YES ☐ → If YES, please provide details below.
NO ☐

SECTION 3

3A Did anyone ever tell you unpleasant stories involving heights, or warn you of some danger associated with heights?

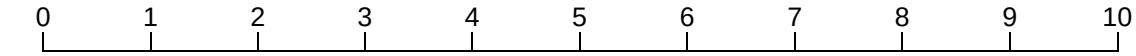
YES ☐ → If YES, please describe the nature of the stories or warnings in the space below.
NO ☐ → If NO, please turn to **page 7** and continue at question **4A.**

3B How much fear or distress did you experience in this incident? (Please circle a number on the scale below.)

0 1 2 3 4 5 6 7 8 9 10

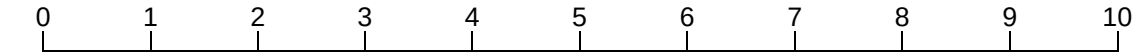
No fear — Worst fear I can imagine

3C We are interested in how you felt about heights **before** this incident. **Before** this incident occurred, how dangerous did you think heights were? (Please circle a number on the scale below.)



Not dangerous at all — Deadly

3D **Before** this incident occurred, how much did you fear heights?
(Please circle a number on the scale below.)



No fear — Worst fear I can imagine

3E Have you been excessively fearful of heights ever since you were told the stories or warnings that you described on the previous page?

YES ☐
NO ☐

3F Were you ever able to confront heights with complete ease after you were told these stories or warnings?

YES ☐
NO ☐

3G Were you excessively fearful of heights **before** you were told these stories / warnings?

YES ☐
NO ☐

3H In the time since these stories or warnings, has anything happened that has changed your view of them? In particular, do heights seem more dangerous now than it did at the time?

YES ☐ → If YES, please provide details below.
NO ☐

3I How old were you at the time when you were told these stories or warnings?

_____ years

3J At the time that you were told these stories or warnings, do you recall any extra pressures in your life that you found stressful (e.g., financial, family, work, or health problems, death of a close friend, etc.)? If you do recall such pressures, please describe them briefly below.

3K At the time that you were told these stories or warnings, were you experiencing depression?

YES ☐ → If YES, briefly describe the depressive periods, including any medication or treatment that you received in the space below.

NO ☐

3L **<u>Before</u>** you were told these stories or warnings, were you told any similar stories or warnings? Please give details of any similar prior encounters with height-related stories/warnings, even if they didn't cause you distress or anxiety at the time.

3M **I**n the time since this incident/s (described in 3L), has anything happened that has changed your view of what occurred? In particular, does the event/s seem more dangerous now than it did at the time?

YES ☐ → If YES, please provide details below.

NO ☐

SECTION 4

4A Did you ever read, see on television or at the movies, or hear on the radio, anything unpleasant about heights?

YES ☐ → If YES, please describe the incident/s in the space provided below.
NO ☐ → If NO, please turn to **page 9** and continue at question **5A.**

4B How much fear or distress did you experience in this incident? (Please circle a number on the scale below.)

0 1 2 3 4 5 6 7 8 9 10

No fear — Worst fear I can imagine

4C We are interested in how you felt about heights **before** this incident. **Before** this incident occurred, how dangerous did you think heights were? (Please circle a number on the scale below.)

0 1 2 3 4 5 6 7 8 9 10

Not dangerous at all — Deadly

4D **Before** this incident occurred, how much did you fear heights?
(Please circle a number on the scale below.)

0 1 2 3 4 5 6 7 8 9 10

No fear — Worst fear I can imagine

4E Have you been excessively fearful of heights ever since the incident/s that you described above?

YES ☐
NO ☐

4F Were you ever able to confront heights with complete ease after this incident/s?

YES ☐
NO ☐

4G Were you excessively fearful of heights **before** this incident/s?

YES ☐
NO ☐

4H In the time since this incident/s, has anything happened that has changed your view of what occurred that day? In particular, does the event seem more dangerous now than it did at the time?

YES ☐ → If YES, please provide details below.
NO ☐

4I How old were you at the time of the incident/s that you described on the previous page?

_____ years

4J At the time of the incident/s described on the previous page, do you recall any extra pressures in your life that you found stressful (e.g., financial, family, work, or health problems, death of a close friend, etc.)? If you do recall such pressures, please describe them briefly below.

4K At the time of the incident/s described on the previous page, were you experiencing depression?

YES ☐ →
NO ☐

If YES, briefly describe the depressive periods, including any medication or treatment that you received in the space below.

4L **<u>Before</u>** the media event you saw or heard (described in 4A), have you seen or heard similar media events? Please give details of any similar prior encounters with height-related media events, even if they didn't cause you distress or anxiety at the time.

4M In the time since this incident/s (described in 4L), has anything happened that has changed your view of what occurred? In particular, does the event/s seem more dangerous now than it did at the time?

YES ☐ → If YES, please provide details below.
NO ☐

SECTION 5

5A Were you ever hurt or injured in the presence of heights?

YES ☐ → If YES, please describe the incident/s in the space provided below.
NO ☐ → If NO, please turn to **page 11** and continue at question **6A.**

5B How much fear or distress did you experience in this incident? (Please circle a number on the scale below.)

0 1 2 3 4 5 6 7 8 9 10

No fear — Worst fear I can imagine

5C Were you physically hurt in the initial fear incident? If yes, how much pain did you experience? (Please circle a number on the scale below.)

0 1 2 3 4 5 6 7 8 9 10

No pain — Worst pain I can imagine

5D We are interested in how you felt about heights **before** this incident. **Before** this incident occurred, how dangerous did you think heights were? (circle a number on the scale below.)

0 1 2 3 4 5 6 7 8 9 10

Not dangerous at all — Deadly

5E **Before** this incident occurred, how much did you fear heights?
(Please circle a number on the scale below.)

0 1 2 3 4 5 6 7 8 9 10

No fear — Worst fear I can imagine

5F Have you been excessively fearful of heights ever since the incident/s that you described above?

YES ☐
NO ☐

5G Were you ever able to confront heights with complete ease after this incident/s?

YES ☐
NO ☐

5H Were you excessively fearful heights **before** this incident/s?

YES ☐
NO ☐

5I In the time since this incident, has anything happened that has changed your view of what occurred that day? In particular, does the event seem more dangerous now than it did at the time?

YES ☐ → If YES, please provide details below.
NO ☐

5J How old were you at the time of the incident/s that you described on the previous page?

_____ years

5K At the time of the incident/s described on the previous page, do you recall any extra pressures in your life that you found stressful (e.g., financial, family, work, or health problems, death of a close friend, etc.)? If you do recall such pressures, please describe them briefly below.

5L At the time of the incident/s described on the previous page, were you experiencing depression?

YES ☐ →
NO ☐

If YES, briefly describe the depressive periods, including any medication or treatment that you received in the space below.

5M In **prior** encounters with heights (i.e., in encounters **before** the incident described), had anything similar ever happened to you? Please give details of any similar prior encounters with heights, even if they didn't cause you distress or anxiety at the time.

5N In the time since this incident (described in 5M), has anything happened that has changed your view of what occurred? In particular, does the event/s seem more dangerous now than it did at the time?

YES ☐ → If YES, please provide details below.
NO ☐

SECTION 6

6A Can you recall any earlier occasions in which you were at least mildly anxious or fearful in the presence of heights?

YES ☐ → If YES, please describe the incident/s in the space provided below.
NO ☐ → If NO, please turn to **page 13** and continue at **Section 7A.**

6B How much fear or distress did you experience in this incident? (Please circle a number on the scale below.)

0 1 2 3 4 5 6 7 8 9 10

No fear — Worst fear I can imagine

6C We are interested in how you felt about heights **before** this incident. **Before** this incident occurred, how dangerous did you think heights were? (Please circle a number on the scale below.)

0 1 2 3 4 5 6 7 8 9 10

Not dangerous at all — Deadly

6D **Before** this incident occurred, how much did you fear heights?
(Please circle a number on the scale below.)

0 1 2 3 4 5 6 7 8 9 10

No fear — Worst fear I can imagine

6E Have you been excessively fearful heights ever since the incident/s that you described above?

YES ☐
NO ☐

6F Were you ever able to confront the heights with complete ease after this incident/s?

YES ☐
NO ☐

6G Were you excessively fearful of heights **before** this incident/s?

YES ☐
NO ☐

6H In the time since this incident, has anything happened that has changed your view of what occurred that day? In particular, does the event seem more dangerous now than it did at the time?

YES ☐ → If YES, please provide details below.
NO ☐

6I How old were you at the time of the incident/s that you described on the previous page?

_____ years

6J At the time of the incident/s described on the previous page, do you recall any extra pressures in your life that you found stressful (e.g., financial, family, work, or health problems, death of a close friend, etc.)? If you do recall such pressures, please describe them briefly below.

6K At the time of the incident/s described on the previous page, were you experiencing depression?

YES ☐ →
NO ☐

If YES, briefly describe the depressive periods, including any medication or treatment that you received in the space below.

6L In **<u>prior</u>** encounters with heights (i.e., in encounters **<u>before</u>** the incident described), had anything similar ever happened to you? Please give details of any similar prior encounters with heights, even if they didn't cause you distress or anxiety at the time.

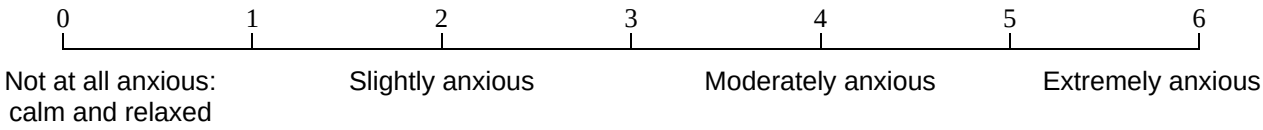
6M In the time since this incident/s (described in 6L), has anything happened that has changed your view of what occurred? In particular, does the event/s seem more dangerous now than it did at the time?

YES ☐ → If YES, please provide details below.
NO ☐

SECTION 7A

Fear of Heights – Part 1: Anxiety Scale

Below we have compiled a list of situations involving height. Imagine how anxious (tense, uncomfortable) you would feel if you were in each of these situations. Please indicate how you imagine you would feel by putting one of the following numbers (0, 1, 2, 3, 4, 5, or 6) corresponding to the scale below in the space to the left of each item.

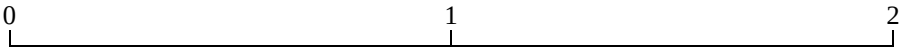


Rate item here		
	1	Diving off the low board at a swimming pool.
	2	Stepping over rocks crossing a stream.
	3	Looking down a circular stairway from several flights up.
	4	Standing on a ladder leaning against a house, second storey.
	5	Sitting at the front of the second balcony of a theatre.
	6	Riding a Ferris wheel.
	7	Walking up a steep incline while hiking.
	8	Taking an aeroplane trip.
	9	Standing next to an open window on the third floor.
	10	Walking on a footbridge over a highway.
	11	Driving over a large bridge.
	12	Being away from the window in an office on the 15th floor of a building.
	13	Seeing window washers ten flights up on a scaffold.
	14	Walking over a footpath grating.
	15	Standing on the edge of a railway platform.
	16	Climbing up a fire escape to the 3rd floor landing.
	17	Being on the roof of a ten storey apartment building.
	18	Taking a lift to the 50th floor.
	19	Standing on a chair to get something off a shelf.
	20	Walking up the boarding gangplank of a large boat.

SECTION 7B

Fear of Heights – Part 2: Avoidance Scale

Now that you have rated each item according to anxiety, we would like you to rate them in terms of avoidance. Using the following rating scale, indicate in the space to the left of the items below how much you would now avoid the situation, if it arose.



Would not avoid doing it — Would try to avoid doing it — Would not do it under any circumstances

Rate item here		
	1	Diving off the low board at a swimming pool.
	2	Stepping over rocks crossing a stream.
	3	Looking down a circular stairway from several flights up.
	4	Standing on a ladder leaning against a house, second storey.
	5	Sitting at the front of the second balcony of a theatre.
	6	Riding a Ferris wheel.
	7	Walking up a steep incline while hiking.
	8	Taking an aeroplane trip.
	9	Standing next to an open window on the third floor.
	10	Walking on a footbridge over a highway.
	11	Driving over a large bridge.
	12	Being away from the window in an office on the 15th floor of a building.
	13	Seeing window washers ten flights up on a scaffold.
	14	Walking over a footpath grating.
	15	Standing on the edge of a railway platform.
	16	Climbing up a fire escape to the 3rd floor landing.
	17	Being on the roof of a ten storey apartment building.
	18	Taking a lift to the 50th floor.
	19	Standing on a chair to get something off a shelf.
	20	Walking up the boarding gangplank of a large boat.

SECTION 8

Trait Anxiety

A number of statements which people have used to describe themselves are given below. Read each statement and then circle the number which indicates how you generally feel. There are no right or wrong answers. Do not spend too much time on any one statement, but give the answer which seems to describe your feelings best.

	Not at all	Somewhat	Moderately	Very much
I feel pleasant	1	2	3	4
I feel nervous and restless	1	2	3	4
I am satisfied with my life	1	2	3	4
I wish I could be as happy as others seem to be	1	2	3	4
I feel like a failure	1	2	3	4
I feel rested	1	2	3	4
I am “calm, cool, and collected”	1	2	3	4
I feel that difficulties are piling up so that I cannot overcome them	1	2	3	4
I worry too much over something that doesn’t really matter	1	2	3	4
I am happy	1	2	3	4
I have disturbing thoughts	1	2	3	4
I lack self-confidence	1	2	3	4
I feel secure	1	2	3	4
I make decisions easily	1	2	3	4
I feel inadequate	1	2	3	4
I am content	1	2	3	4
Some unimportant thought runs through my mind and bothers me	1	2	3	4
I take disappointments so keenly I can’t put them out of my mind	1	2	3	4
I am a steady person	1	2	3	4
I get in a state of tension or turmoil as I think over my recent concerns and interests	1	2	3	4

Thank you for completing this questionnaire

Please mail it using the envelope provided

APPENDIX G

Comparisons Between Participants Who Did and Did Not Complete All Three Questionnaires.

TABLE 15
Comparison of Age, Height Fear Severity, and Trait Anxiety Between Those in the Fearful Group Who Did and Did Not Complete All Three Questionnaires

	All three questionnaires completed	N	Mean	Std. Deviation
AQ-Anxiety				
	Yes	22	55.68	15.37
	No	8	59.13	26.69
AQ-Avoidance				
	Yes	22	12.27	5.25
	No	8	15.88	8.10
STAI-T				
	Yes	21	47.67	9.74
	No	8	45.88	9.09
Age	Yes	22	35.09	12.10
	No	8	30.38	14.33

TABLE 16
Comparison of Age, Height Fear Severity, and Trait Anxiety Between Those in the Non-Fearful Group Who Did and Did Not Complete All Three Questionnaires

	All three questionnaires completed	N	Mean	Std. Deviation
AQ-Anxiety				
	Yes	33	11.97	7.05
	No	14	17.36	18.61
AQ-Avoidance				
	Yes	33	1.82	1.89
	No	14	3.71	4.43
STAI-T				
	Yes	33	38.06	9.79
	No	14	42.43	7.53
Age	Yes	33	30.61	11.06
	No	14	22.93	5.34

APPENDIX H

OQ-II Scoring Criteria

Based on the responses made on the OQ-II, participants are classified into the following categories:

1: Classical conditioning
2: Vicarious conditioning
3: Informational / instructional conditioning
4: Multiple associative pathways
5: Non-conditioning traumatic event
6: Always been this way
7: Mixed pathways
8: Cannot remember
9: Cannot classify

To meet the criteria for categories 1 to 5, the participant must indicate that they have been fearful of heights, or unable to confront heights ever since the events described. In addition, they must also indicate that they were not excessively fearful before the event.

Classification for category 1 (classical conditioning) requires either answer A or answer B at Question 1. The participant must describe an initial event at 2A, 2F, 5A, or 6A that includes an independent UCS (that caused fear, pain or distress) and the presence of the CS (heights).

Classification for category 2 (vicarious conditioning) requires either answer A or answer B at Question 1. The participant must describe an initial event at 2A, 2F, 3B, 4A, or 6A in which they saw someone become hurt, frightened or distressed in the presence of heights.

Classification for category 3 (informational/instructional conditioning) requires either answer A or answer B at Question 1. The participant must describe the transmission of unpleasant stories/warnings/instructions/information at Question 2A, 2F, 3O, 4A, or 6A.

Classification for category 4 (multiple associative pathways) requires either answer A or answer B at Question 1. The participant must meet the classification criteria for at least two of the three conditioning pathways, but not provide contradictory reports that would lead to classification of category 9.

Classification for category 5 (non-conditioning associative event) requires either answer A or answer B at Question 1. The participant must describe an event at 2A, 2F, or 6A that includes the presence of the CS (heights), but does not include the presence of an independent UCS.

Classification for category 6 (always been this way) requires answer C at Question 1.

Classification for category 7 (mixed pathways) requires the participant meet the classification criteria for both category 5 and one other associative pathway (categories 1 to 4). This classification is also warranted when the described onset incident involves associative and non-associative components occurring or being experienced simultaneously at the same event.

Classification for category 8 (cannot remember) requires answer B at Question 1, and failure to satisfy the requirements for categories 1 to 4 from Question 3 onwards.

Classification for category 9 (cannot classify) requires inconsistent answers that would otherwise lead to multiple classifications.

APPENDIX I

STAI-T Y-2 Permission for Use

APPENDIX J

Massey University Human Ethics Committee (MUHEC) Approval

APPENDIX K

Research Confidentiality Agreement

APPENDIX L

Formulas and Interpretation for Coefficients of Effect Size

$r_{Y\lambda} = \Phi = \sqrt{(X^2(1) / N)}$

$d = t(n_1 + n_2) / [\sqrt{(df)}\sqrt{(n_1 n_2)}]$

Cohen's Standard	*d*	r
	2.0	.707
	1.9	.689
	1.8	.669
	1.7	.648
	1.6	.625
	1.5	.600
	1.4	.573
	1.3	.545
	1.2	.514
	1.1	.482
	1.0	.447
	0.9	.410
LARGE	0.8	.371
	0.7	.330
	0.6	.287
MEDIUM	0.5	.243
	0.4	.196
	0.3	.148
SMALL	0.2	.100
	0.1	.050
	0.0	.000

APPENDIX M

Raw Data on Participants' Pathway Ascriptions

1: Classical conditioning
2: Vicarious conditioning
3: Informational / instructional conditioning
4: Multiple associative pathways
5: Non-conditioning traumatic event
6: Always been this way
7: Mixed pathways
8: Cannot remember
9: Cannot classify

	Time1	Time2	Time3
Total count (*n*)	30	24	26
Participant ID			
FA128	7	--	--
FA131	5	5	5
FA139	1	1	2
FA140	4	--	4
FA145	1	--	6
FA170	3	2	--
FA201	8	--	--
FA214	6	6	6
FA262	5	5	8
FA263	1	1	1
FA1010	6	6	6
FA1013	2	2	2
FA1014	1	8	6
FA1023	7	1	--
FA1026	6	8	6
FA1033	5	5	5
FA1035	6	6	6
FA1036	5	5	5
FA1038	6	6	6
FA1044	6	6	6
FA1045	9	4	4
FA1052	6	6	6
FA1056	6	6	4
FA1059	6	6	6
FA1062	5	--	5
FA1066	6	6	6
FB1067	8	8	8
FA1071	5	5	5
FA1075	2	4	6
FA10114	6	--	6